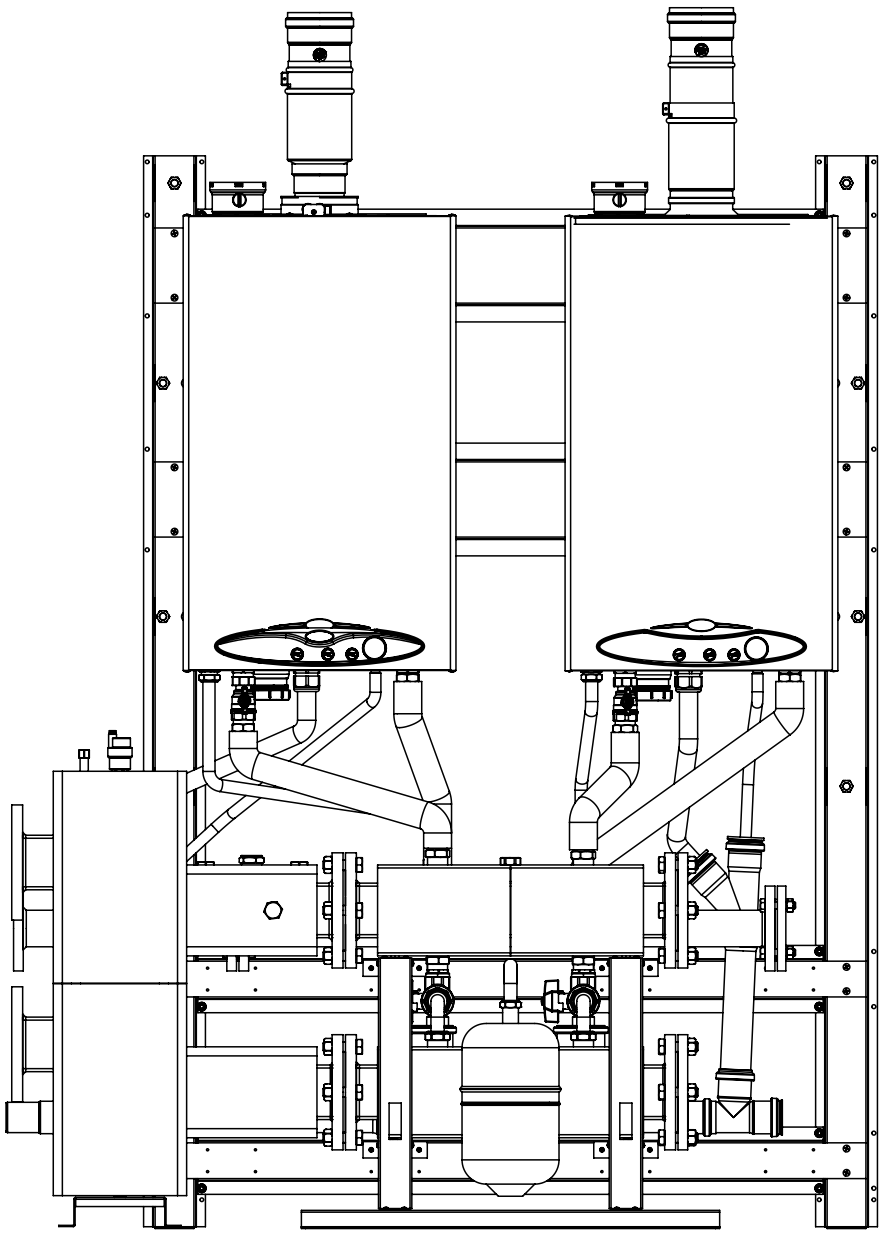
IST 03 C 438 - 02

TAHITI CONDENSING MODULAR GENERATOR KR

with installation rack

EN



INSTALLATION USE AND MAINTENANCE

fondital

Dear Customer,

Thank you for choosing and buying one of our boilers. Please read these instructions carefully. They will enable you to install, operate, and service the appliance properly.
Any maintenance and repairs must be carried out by fully qualified engineers who carry the appropriate competency for this equipment.

General information for fitters, maintenance technicians and users

This INSTRUCTION MANUAL, which is an integral and indispensable part of the product, must be handed over to the user by the installer and must be kept in a safe place for future reference. The manual must accompany the boiler should it be sold or its possession transferred. Following to the boiler installation, the fitter is to advise the user about boiler operation and its safety devices.

This boiler is designed for connection to a domestic heating or hot water system.
Any other use is deemed as improper and as such dangerous. Under no circumstances will the manufacturer be held responsible for damage or injury to persons or animals caused by errors in the installation and/or use of the appliance, or through non-compliance with current local and national standards and/or the manufacturer's instructions.

The boiler must be installed by qualified personnel, in compliance with applicable laws and standards and according to the manufacturer's instructions given in this manual.
Before installing the boiler, check that the technical data corresponds to the requirements for its correct use in the system.

Check that the boiler is intact and it has not been damaged during transport and handling: do not install equipment which is damaged and/or faulty. In case of doubt, do not attempt to use the product but refer to the supplier.

Only manufacturer approved and supplied parts or optional kits (including electric ones) must be used for all repairs to the boiler.

Packing materials (cardboard box, wooden crate, nails, staples, plastic bags, polystyrene, etc.) must not be left within reach of children as these items represent a potential hazard and must be disposed of in a responsible manner.

Properly dispose of the packaging as all the materials can be recycled. The packaging must therefore be sent to specific waste management sites.
In the event of failure and/or malfunction, shut down the system. Do not interfere with or attempt any repairs. Call for professionally qualified technical assistance only.

Failure to comply with the above requirements may affect the safety of the boiler and endanger people, animals and property.

Before carrying out any cleaning or maintenance operations, disconnect the appliance from the mains electricity supply by switching off at the main switch and/or any other isolating device.

In order to guarantee efficient and correct operation of the equipment, the manufacturer recommends that the boiler be serviced and repaired by a qualified Service Centre.

Routine boiler maintenance is to be performed according to the schedule indicated in the relevant section of this manual. Appropriate boiler maintenance ensures efficient operation, environment preservation, and safety for people, animals and objects. Incorrect or irregular maintenance can cause a hazard for people, animals and property.

In the event of long periods of inactivity of the boiler, disconnect it from power mains and close the gas tap.
Warning! When power mains are disconnected, boiler electronic antifreeze function will not be operative.

Should there be a risk of freezing, add antifreeze: use specific antifreeze products suitable for multi-metal heating systems.
It is not advisable to empty the system as this may result in damage.

Should you smell gas:
- do not turn on or off electric switches and do not turn on electric appliances;
- do not ignite flames and do not smoke;
- close the main gas tap;
- open doors and windows;
- contact a Service Centre, a qualified installer or the gas supply company
Never use flames to detect gas leaks.

The boiler is designed for installation in the country indicated on the technical data plate: installation in any other country may be source of danger for people, animals and objects.

The Manufacturer cannot be held contractually or extra-contractually liable in the event of failure to comply with the above.

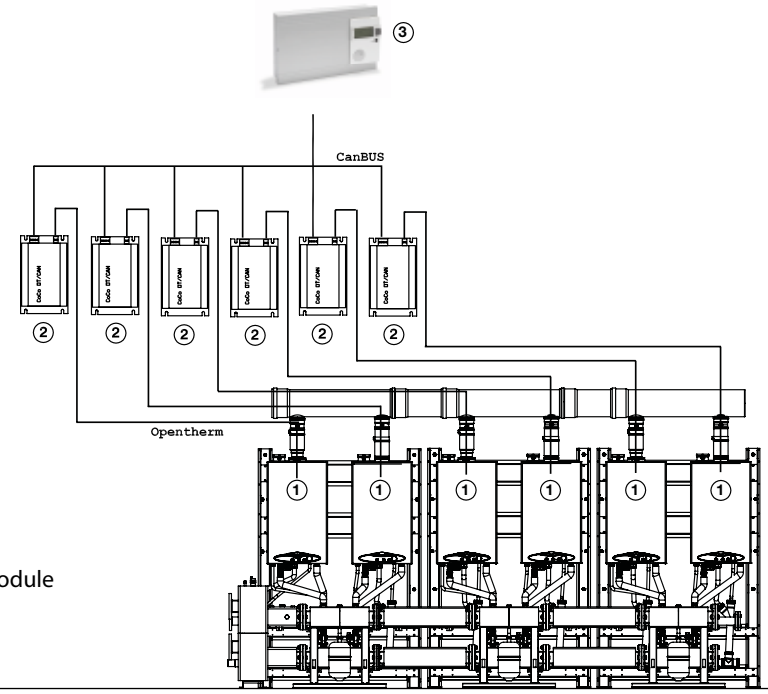
TABLE OF CONTENTS

General information for fitters, maintenance technician and user ..... page 3
1. User instructions ..... page 5
1.1. Boiler control panel ..... page 6
1.2. Boiler LCD ..... page 7
1.3. Boiler status – LCD operation ..... page 8
1.4. Control unit ..... page 9
1.5. Antifreeze function ..... page 13
1.6. Pump anti-seize function ..... page 14
1.7. Operation with an external probe ..... page 14
1.8. Heating system lockout ..... page 15
1.8.1. Boiler burner lockout ..... page 15
1.8.2. Lockout due to overheating ..... page 15
1.8.3. Lockout due to air/flue gas system malfunction ..... page 15
1.8.4. Lockout due hot melt fuse operation ..... page 15
1.8.5. Lockout due to a water circulation malfunction ..... page 15
1.8.6. Lockout for fan malfunction ..... page 15
1.8.7. Alarm due to boiler temperature probe malfunction ..... page 16
1.8.8. Alarm due to water heater temperature probe malfunction ..... page 16
1.8.9. Alarm due to control unit wrong connection ..... page 16
1.8.10. Alarm due to manifold probe malfunction ..... page 16
1.8.11. Alarm due to external probe malfunction ..... page 16
1.9. Maintenance ..... page 16
1.10. Notes for the user ..... page 16
2. Technical features and dimensions ..... page 17
2.1. Technical features ..... page 17
2.2. Dimensions and couplings ..... page 18
2.3. Main components for the KR 55 ..... page 19
2.4. Main components for the KR 85 ..... page 20
2.5. Operating data ..... page 21
2.6. General characteristics ..... page 21
2.7. Pumping head ..... page 23
3. Instructions for the fitter ..... page 26
3.1. Installation standards ..... page 26
3.2. Installation ..... page 26
3.2.1. Packaging ..... page 26
3.2.2. Choosing where to install the boiler ..... page 26
3.2.2.1. Height of the installation area ..... page 26
3.2.3. Air vents in the installation area ..... page 26
3.2.4. Positioning the boiler ..... page 27
3.2.5. Antifreeze protection ..... page 27
3.2.6. Installing the boiler ..... page 27
3.2.6.1. Fixing the control unit to the wall ..... page 27
3.2.7. Control unit setting ..... page 28
3.2.8. Testing combustion efficiency ..... page 30
3.2.8.1. Chimney-sweep function ..... page 30
3.2.8.2. Measurement procedure ..... page 31
3.2.9. Connecting to the gas mains ..... page 31
3.2.10. Connecting the control cabinet to the power mains ..... page 32
3.2.11. Connection the control cabinet to the boilers ..... page 33
3.2.12. Connecting to the external probe and sliding temperature operation ..... page 34
3.3. Filling the system ..... page 36
3.4. Starting the boiler ..... page 36
3.4.1. Preliminary checks ..... page 36
3.4.2. Switching on and off ..... page 36
3.5. Standard control cabinet ..... page 37
3.6. Boiler wiring diagrams ..... page 38
3.7. Adapting to other gases and regulating the burner ..... page 41
3.7.1. Switching from METHANE to PROPANE ..... page 41
3.7.2. Switching from PROPANE to METHANE ..... page 41
3.7.3. Regulating the burner ..... page 41
4. Commissioning the boiler ..... page 42
4.1. Preliminary checks ..... page 42
4.2. Switching on and off ..... page 42
5. Maintenance ..... page 43
5.1. Maintenance schedule ..... page 43
5.2. Combustion analysis ..... page 43
6. Troubleshooting ..... page 44

1. User instructions

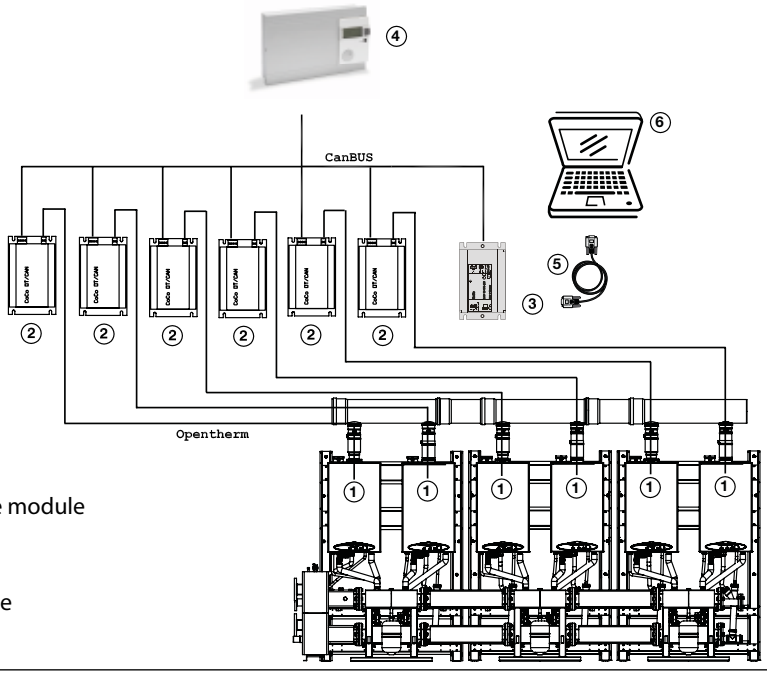
There are three types of control cabinet:

1. Standard control cabinet: for controlling the system from the control unit, with no external communication



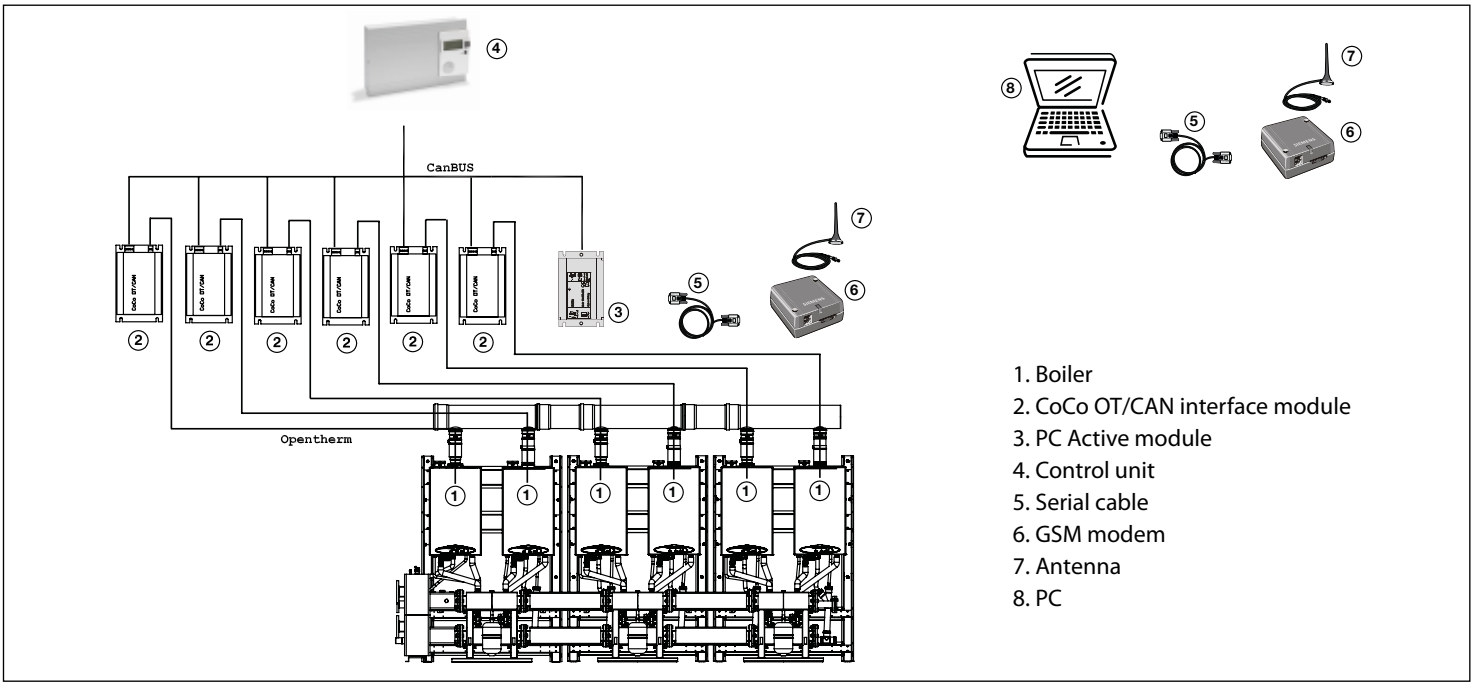
1. Boiler
2. CoCo OT/CAN interface module
3. Control unit

2. Control cabinet with a Co/Co PC Active module: for controlling the system via a local PC



1. Boiler
2. CoCo OT/CAN interface module
3. PC Active module
4. Control unit
5. Null-modem serial cable
6. PC

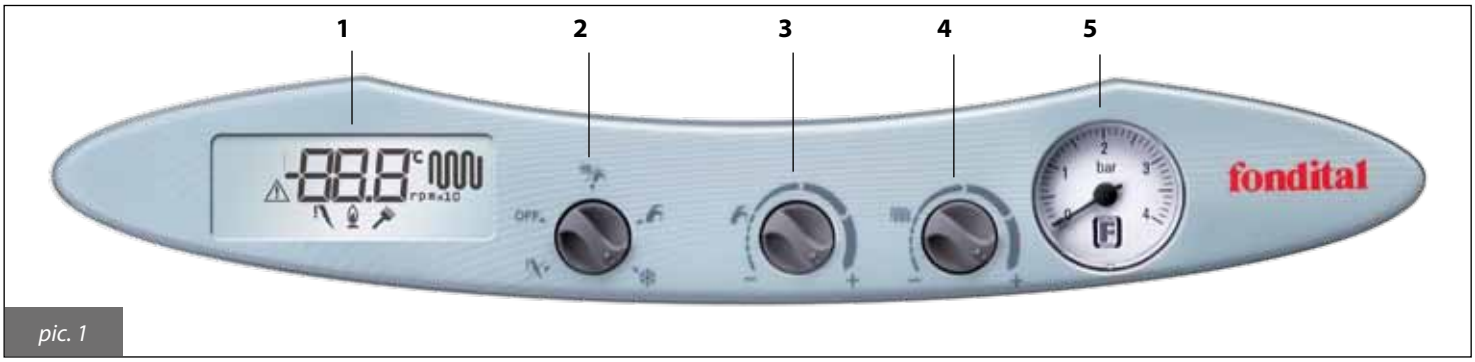
3. Control cabinet with a GSM modem: for controlling the system via a remote PC



1. Boiler
2. CoCo OT/CAN interface module
3. PC Active module
4. Control unit
5. Serial cable
6. GSM modem
7. Antenna
8. PC

1.1. Boiler control panel

If boilers are connected to the control unit, certain features of the control panel are disabled.



pic. 1

1. Liquid crystal display (LCD)
The LCD displays the boiler status and operating data (pic. 1).

2. Boiler function selector
With the selector on RESET the boiler restarts after activation of the burner shutdown device (lockout).
With the selector on OFF, the boiler is in stand-by mode, heating function is disabled.
The SUMMER position has no influence on the boiler operation.
With the selector on WINTER, the boiler is ready for providing hot water for the CH system.
The Antifreeze position doesn't affect boiler operation.
Place the boiler selector in WINTER mode position.

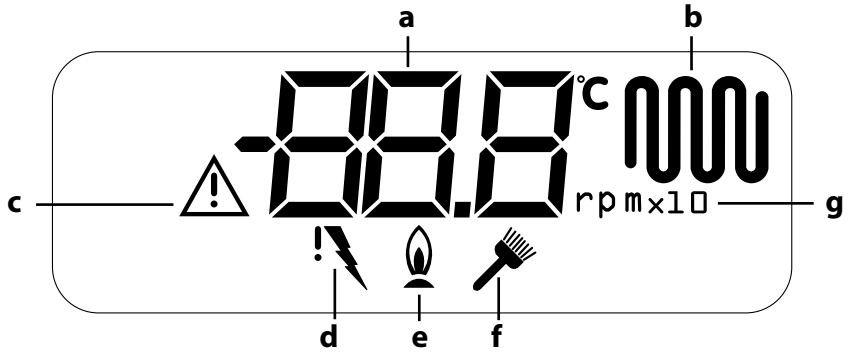
For proper operation of the boiler, set the selector to WINTER mode position.

3. DHW temperature regulator
This regulator is not active. The domestic hot water must be regulated on the system's control unit and not on each single boiler.

4. CH water temperature regulator
This regulator is not active. The heating water must be regulated on the system's control unit and not on each single boiler.

5. Water pressure gauge
This shows the pressure of the water in the CH system.

1.2. Boiler LCD



pic. 2

a. Alphanumeric indicator
This shows the following:
- CH flow water temperature
- CH temperature setting
- boiler status
- boiler diagnostics

b. Central heating indicator
This comes on when the boiler is in CH mode.

c. Boiler shutdown indicator
This comes on when there is a malfunction that cannot be reset via the boiler funtion selector **2** (pic. 1).
The problem must be solved before the boiler can be restarted.

d. Burner shutdown indicator
This comes on when the burner shutdown device activates due to a malfunction.
To restart the boiler, turn the boiler selector **2** (pic. 1) to the RESET position for a few seconds and then back to the desired position.

e. Flame indicator
This comes on when the burner flame is present.

f. Chimney-sweep function indicator (for fitter only)
This flashes when the chimney-sweep function is activated.
The flow water temperature and the number of fan revs are shown alternatively (in this case, symbol **g** is also shown)

g. Number of fan revs (for fitter only)
When the chimney-sweep function is activated, symbol **f** flashes and flow water temperature and number of fan revs are shown alternatively (in this case, the correspondent symbol is also shown).

1.3. Boiler status – LCD operation

Normal operation

Boiler selector on OFF	
Boiler selector on Antifreeze	
Boiler selector on WINTER **No function active** **The flow water temperature is displayed**	
Boiler selector on WINTER **CH function active** **The flow water temperature is displayed**	

Table 1 - *Boiler Status - Message Display with normal operation*

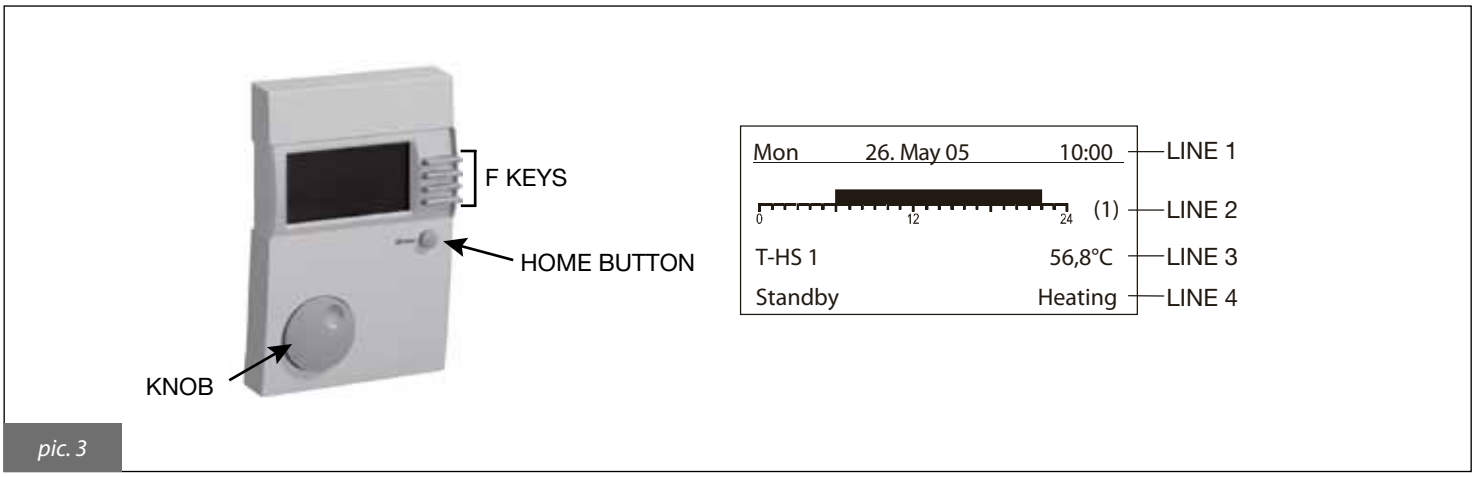
Malfunction

Boiler not powered on	
Boiler lockout due to flame absence	
Boiler lockout due to safety thermostat activation	
Boiler lockout due to flue gas thermostat activation	
Failure of the CH flow probe	
Low primary fluid circulation alarm **(pump ON – flow switch OPEN)**	
Low primary fluid circulation alarm **(pump OFF – flow switch CLOSED)**	
Fan failure	
Failure of the connection to the Control Unit	

Table 2 - Boiler status - Message display with malfunction

1.4. Control unit

The control unit is located inside the control cabinet.



pic. 3

Control elements

KNOB: used to enter a setting or parameter;
HOME BUTTON: gives access to the main menu;
F KEYS: to select the setting/parameter shown on a particular display line.

Display

LINE 1: day, date and time;
LINE 2: heating based on the time programme;
LINE 3: boiler 1 temperature;
LINE 4: operating mode on the left, current situation on the right.

1.2.1. Operating modes

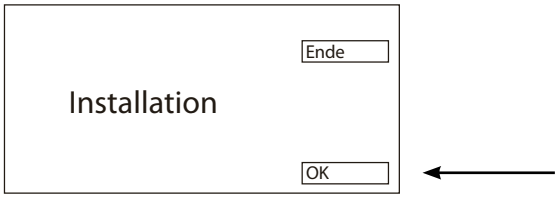
When the control cabinet has been installed by a qualified fitter, the boiler has been started up for the first time and the control cabinet is ready for correct operation, the operating mode must be set on the control unit:

1. Standby: the heating and hot water function is disabled; only antifreeze function is active;
2. Automatic 1: heating is enabled according to time programme 1; hot water is enabled according to the DHW programme;
3. Automatic 2: heating is enabled according to time programme 2; the DHW programme is enabled;
4. Summer: the system only operates to produce hot water according to the DHW programme if connected to an external hot water system;
5. Heat: the boiler is set to heat for 24 hours at temperature 1; the DHW programme is enabled;
6. Reduce: the boiler is set to heat for 24 hours at reduced temperature; the DHW programme is enabled;
7. Assist: (for fitter only) for controlling the cascade manually.

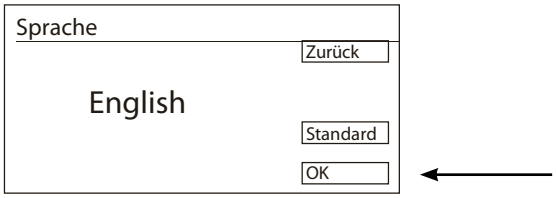
To set an operating mode, press the bottom F key (corresponding to line 4) and select the desired function on the knob.

Control unit first start-up

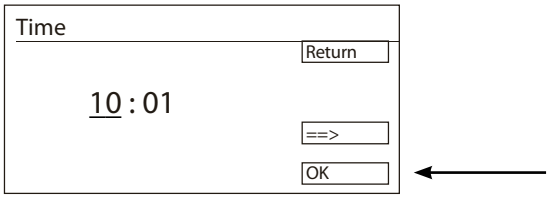
The following is displayed when the control unit is switched on for the first time. Press the F key corresponding to the OK line.



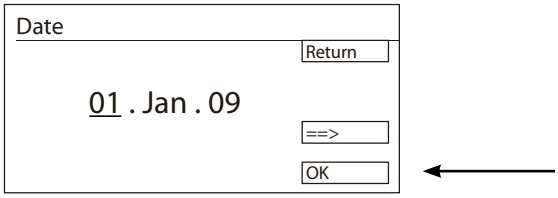
Turn the knob to enter the desired language, then press the bottom F key to confirm.



Now enter the time by turning the knob. To set the hour, press the F key corresponding to ==>; then turn the knob until you reach the desired value. Then press the bottom F key (OK) to confirm. Do the same to set the minutes.



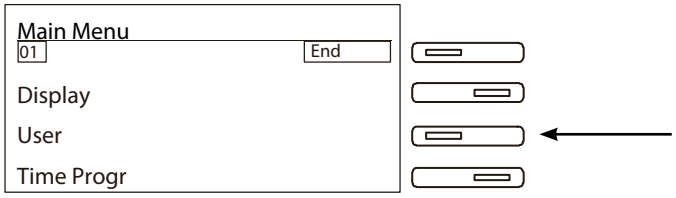
Now enter the date by turning the knob. To set the day, month and year, press the F key corresponding to ==>, then turn the knob until you reach the desired value. Then press the bottom F key (OK) to confirm.



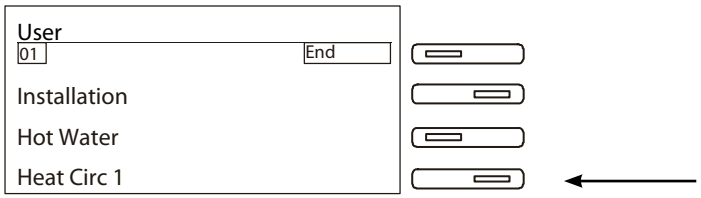
Once you have entered all the parameters, press the HOME button.

Setting the room temperature

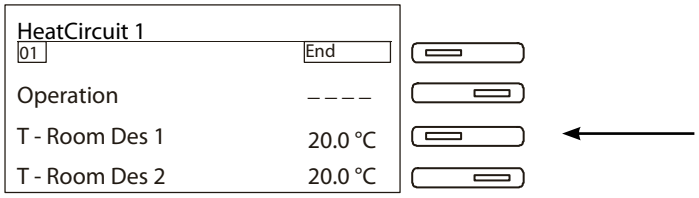
To set the room temperature, press the HOME button to call up the main menu. Use the knob to scroll through the menu. Press the F key corresponding to USER.



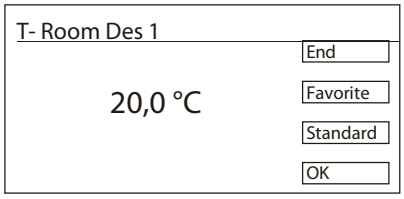
After entering the User submenu, press the F key corresponding to HEAT CIRCUIT 1.



In the HEAT CIRCUIT 1 submenu, you can enter 3 different temperatures. Press the F key corresponding to T-Room Des 1.

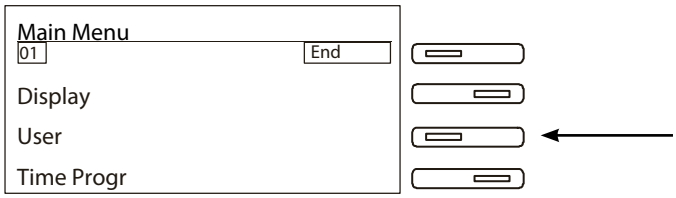


Turn the knob clockwise or anticlockwise to set the temperature, then press the F key corresponding to OK.

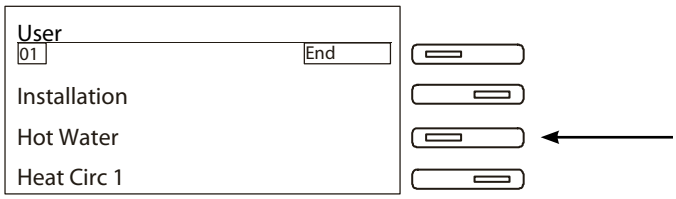


Setting the hot water temperature

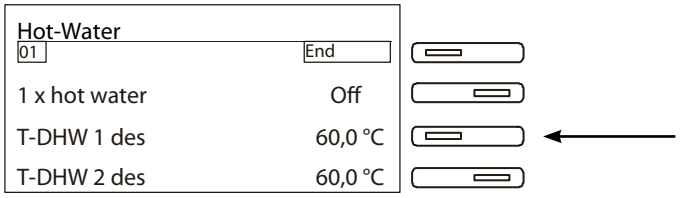
To set the hot water temperature, press the HOME button to call up the main menu. Use the knob to scroll through the menu. Press the F key corresponding to USER.



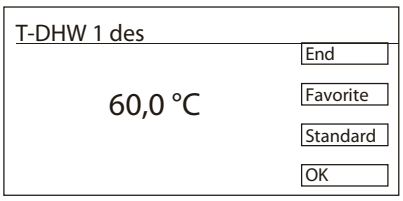
After entering the User submenu, press the F key corresponding to HOT WATER;



In the Hot Water submenu, you can enter 3 different temperatures. Press the F key corresponding to T - DHW 1 des.

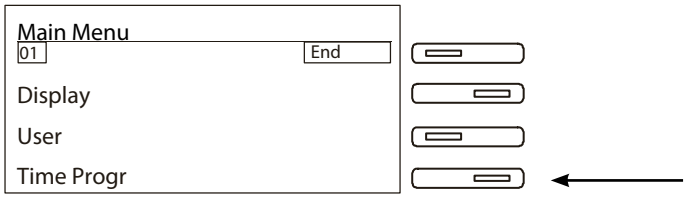


Turn the knob clockwise or anticlockwise to set the temperature, then press the F key corresponding to OK.

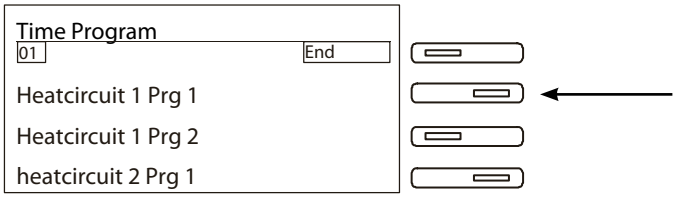


Setting the heating programme (time programme 1)

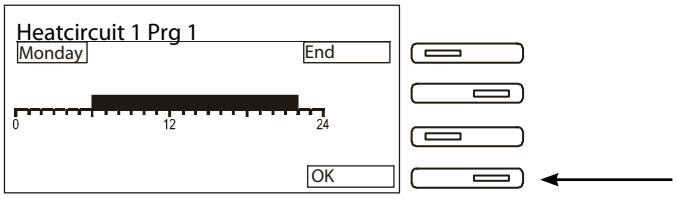
To set the heating programme, press the HOME button to call up the main menu. Use the knob to scroll through the menu. Press the F key corresponding to TIME PROGR.



After entering the Time Progr submenu, press the F key corresponding to HEATCIRCUIT 1 PRG 1.



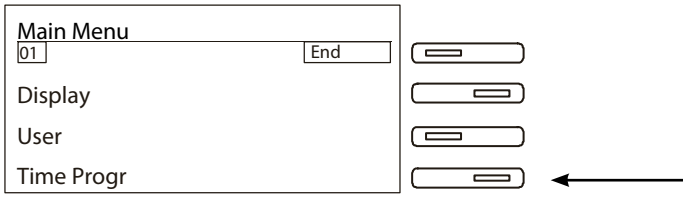
Turn the knob in the Heat Circuit 1 Prg 1 submenu to display the set operating ranges for each day of the week. If you wish to change the operating range for a particular day, press the OK button on the screen for that day.



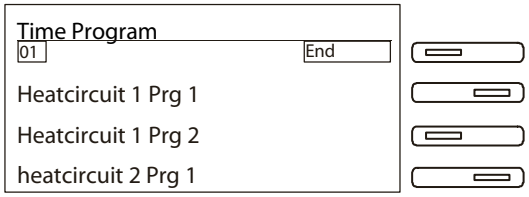
There are 3 operating ranges for each day of the week. When you have selected one of the programmes, press the F key corresponding to OK to confirm.

Setting the water heater programme (DHW programme)

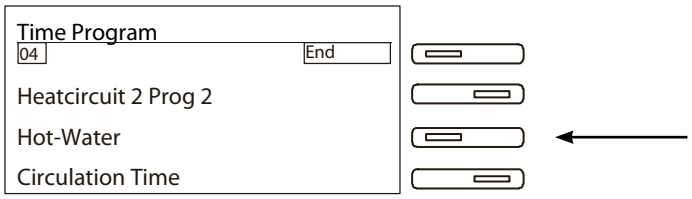
To set the water heater programme, press the HOME button to call up the main menu. Use the knob to scroll through the menu. Press the F key corresponding to TIME PROGR.



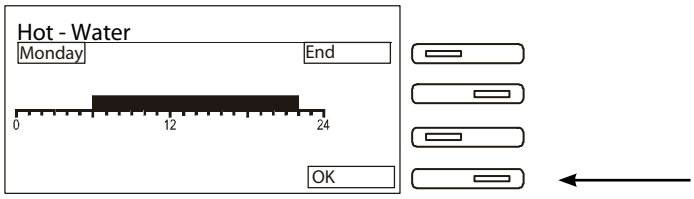
In the Time Progr submenu, turn the knob to display HOT WATER.



Press the F key corresponding to Hot Water.



Turn the knob in the Hot Water submenu to display the set operating ranges for each day of the week. If you wish to change the operating range for a particular day, press the F key corresponding to the OK button on the screen for that day.



There are 3 operating ranges for each day of the week. When you have selected one of the programmes, press the F key corresponding to OK to confirm.

1.5. Antifreeze function

The system comes with an antifreeze protection system.

When the external probe reads a temperature below 0°C (default value, possible adjustable range -15°C to 5°C), the system switches on and runs until the nominal temperature is reached. The nominal temperature varies with the value read by the external probe, the nominal fictitious room temperature (default value 5°C) and the selected heating curve.

When the manifold probe reads a temperature below 5°C (default value), the system activates and runs until a temperature of 20°C is reached. When the heating water temperature sensor reads a temperature of 5°C, the boiler switches on at minimum heat output until the water heating temperature rises to 30°C or 15 minutes have elapsed.
If the boiler shuts down, the pump continues to operate.

The heating system can also be protected effectively from frost by using specific antifreeze products suitable for multi-metal systems.
Periodically check the effectiveness of the additive.
Do not use vehicle antifreeze products.

If the heating system is fitted with optional external heater for DHW production fitted with a NTC temperature sensor (5 kΩ; please refer to the heater technical characteristics), when the heater temperature sensor detects a temperature of 7°C, the boiler switches on and stays on at its minimum thermal power until the temperature of the water in the heater reaches 9°C

If the heating system is fitted with optional external heater for DHW production fitted with a thermostat-type temperature sensor, the antifreeze function DOES NOT protect the water heater.
If the boiler shuts down, the water heater will not be protected against freezing.

1.6. PUMP ANTI-SEIZE function

If
- the boiler remains inactive;
- the control unit is not on standby;
- the system is NOT electrically disconnected from the mains;

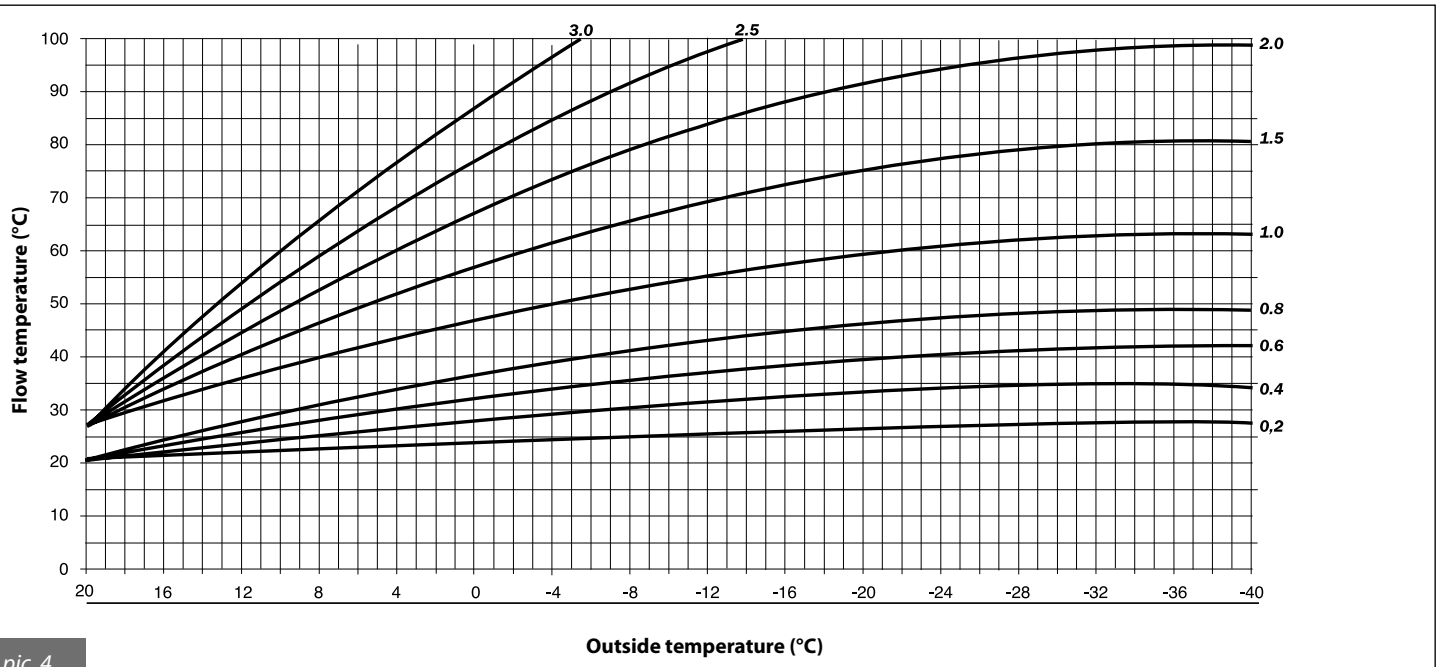
the boiler circulation pumps are activated for a short period every 24 hours to prevent them from shutting down.

1.7. Operation with an external probe

The boiler can be connected to an external temperature probe (optional).

When the external temperature has been measured, the boiler automatically regulates the CH water temperature, increasing it when the outside temperature drops and decreasing it when it rises, which improves comfort and saves fuel (this is referred to as "sliding temperature operation"). The CH water temperature varies according to a program in the boiler's microprocessor.

Figure 4 shows the curves for a calculated room temperature of 20°C.
If the value is increased or decreased via knob 4, the curve shifts up and down, respectively, by the same amount.



pic. 4

With this setting, for example, if you select the curve corresponding to parameter 1 and the outdoor temperature is -4°C, the flow temperature will be 50°C.
For details on sliding temperature operation mode, refer to § 3.2.12.

Only original external probes supplied by the manufacturer must be used.
If non-original external probes are used, correct operation of the boiler and the probe cannot be guaranteed.

1.8. Heating system lockout

The heating system locks out automatically if a malfunction occurs.
Refer to Tables 1 and 2 to identify the boiler operating mode.
Refer to Table 2 and section 6 to identify possible causes of the shutdown. The troubleshooting section is at the end of this manual.
Below is a list of possible causes of the shutdown and the procedure to follow in each case.

1.8.1. Boiler burner lockout

If the burner locks out as there is no flame, the burner shutdown symbol is displayed and code E01 flashes.
This code also appears on the control unit display. If this happens, proceed as follows:
• check that the gas cock is open and light a kitchen gas ring for example to check the gas supply;
• if the gas supply is normal, turn selector 2 (pic. 1) to the reset position for a few seconds, then back to the WINTER position: if after three attempts the burner still fails to ignite, contact a Service Centre or a qualified service engineer.
In this case operation of the cascade system is guaranteed, bypassing the boiler that has shut down. When the problem has been solved, the boiler rejoins the cascade system.
If the burner locks out frequently, there is a recurring malfunction, so contact a Service Centre or a qualified service engineer.

1.8.2. Lockout due to overheating

If the flow water temperature is too high, the 55 kW boiler will lock out. The burner lockout symbol is displayed and code E02 flashes. This code also appears on the control unit display.
Contact a Service Centre or a qualified service engineer.

1.8.3. Lockout due to air intake/flue gas discharge system malfunction (model 55 only)

If the air intake/flue gas discharge system malfunctions, the 55 kW boiler locks out. The burner lockout symbol is displayed and code E03 (flue gas thermostat operation) flashes. This code also appears on the control unit display.
Contact a Service Centre or a qualified service engineer.

1.8.4. Lock out due to hot melt fuse operation (model 85 only)

If the air intake/flue gas discharge system malfunctions, the 85 kW boiler locks out. The burner lockout symbol is displayed and code E03 (hot melt fuse operation) flashes. This code also appears on the control unit display.
Contact a Service Centre or a qualified service engineer.

1.8.5. Lockout due to a water circulation malfunction

If the pressure or water circulation in the heating system are incorrect, the boilers lock out. The boiler lockout symbol is displayed and codes E10 or E26 flash, according to the malfunction.

With code E10 flashing there can be two different situations:
a) the pressure gauge (5, pic. 1) shows a pressure lower than 1 bar

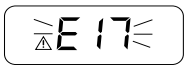
Proceed as follows to restore the correct water pressure:
• Turn the external filling tap anticlockwise to allow water to enter the boiler.
• Keep the tap open until the pressure gauge shows a value of 1.5 bar.
• Turn the tap clockwise to close it.
• Wait a minute until the malfunction disappears from the display.
If the boiler still fails to operate, contact a Service Centre or a qualified service engineer.

Make sure you close the external filling tap carefully after filling.
If you do not, when the pressure increases, the safety valve may activate and discharge.

b) the pressure gauge (5, pic. 1) shows a pressure of 1.5 bar
Contact a Service Centre or a qualified service engineer.

2. With flashing code E26, contact a Service Centre or a qualified service engineer.

1.8.6. Lockout for fan malfunction



Fan operation is constantly monitored and in case of a malfunction it goes off; the boiler lockout symbol is displayed and code E17 flashes.
This mode is maintained until the fan recovers normal working parameters.
If the boiler should not start and remain in this mode, contact a Service Centre or a qualified service engineer.

1.8.7. Alarm due to a boiler temperature probe malfunction

If the burner locks out due to malfunction of the temperature probe, the following flashing code will appear on the boiler's and the controller's LCD displays:
• E05, CH probe: the boiler does not work.
Contact a Service Centre or a qualified service engineer.

1.8.7. Alarm due to water heater external probe malfunction

If the water heater probe malfunctions, code E76 appears on the control unit display. In this case the system operates in heating mode only.
If the system is connected to an external water heater with a temperature thermostat, any failure to the thermostat is not detected by the boiler electronics.
Contact a Service Centre or a qualified service engineer.

1.8.9. Alarm due to control unit wrong connection

The control unit recognizes whether or not there are any boilers.
If the boiler does not receive any information from the control unit, the boiler shutdown symbol is displayed on the boiler ⚠ and code E22 flashes.
Contact a Service Centre or a qualified service engineer.

1.8.10. Alarm due to manifold probe malfunction

If the manifold probe malfunctions, code E78 is displayed on the control unit.
Contact a Service Centre or a qualified service engineer.

1.8.11. Alarm due to external probe malfunction

If the external temperature probe malfunctions, on the control unit display code E75 is shown.
The boiler continues to operate, but the sliding temperature function is disabled.
Contact a Service Centre or a qualified service engineer.

1.9. Maintenance

The boiler must be serviced periodically as indicated in the relevant section of this manual.

Correct maintenance of the boiler will allow it to work efficiently, without harming the environment, and in complete safety.

Maintenance and repairs must be performed by qualified personnel.

The user is strongly advised to have the boiler serviced and repaired by a fully qualified Service Centre.
Refer to section 5 for Maintenance instructions.

The end user may clean the case of the appliance using a proprietary cleaning solution applied to the cloth, not directly to the boiler surface. Do not use water!

1.10. Notes for the user

The user may only access parts of the boiler that can be reached without using special equipment or tools. The user is not authorised to remove the boiler casing or to operate on any internal parts.

No one, including qualified personnel, is authorised to modify the boiler.
The manufacturer cannot be held liable for damage or injury due to tampering of the boiler or improper intervention.

If the boilers remain inactive and the power supply is switched off for a long time, it may be necessary to reset the pumps.
This involves removing the casing and accessing internal parts, so it must only be carried out by suitably qualified personnel.
Pump failure can be avoided by adding proprietary central heating system additives.

2. Technical features and dimensions

2.1. Technical features

The boilers are equipped with a fully pre-mixed gas burner, electronic ignition and ionization flame sensing device.

The heat generators are built using the following boilers in various output combinations:

KR 55: condensing boiler with sealed chamber and forced draught, supplying CH water, 55kW
KR 85: condensing boiler with sealed chamber and forced draught, supplying CH water, 85kW

Each of these boilers is defined as a thermal module. Each combination corresponds to a different thermal output of the modular heating generator. The following combinations of outputs were selected:
110, 140, 170, 220, 250, 280, 310, 340, 360, 390, 420, 450, 480, 510 kW.

The boilers meet applicable laws in force in the country of destination, which is stated on the rating plate.

If the boiler is installed in a country other than the one specified, it may be dangerous for people, animals and objects.

The main technical features of the boilers are listed below:

Construction features:

- IPX4D electrically protected control panel
- Integrated, electronic safety and modulation board
- Electronic ignition via separate igniter and ionization flame detection
- Stainless steel, fully pre-mixed burners
- Stainless steel mono-thermal, high-efficiency heat exchangers with deaerator
- Twin shutter, modulating gas valves with constant air/gas ratio
- Electronically-controlled modulating flue gas discharge fans
- Three-speed pumps with built-in deaerators
- Air separator with deaerator
- Differential pressure switches, fitted in the single boiler units, preventing incorrect water circulation in the CH system
- Hydraulic separator
- CH temperature probe
- Safety thermostat
- Flue gas thermostats
- External temperature probe, manifold probe, water heater probe
- (optional) Rack for wall installation

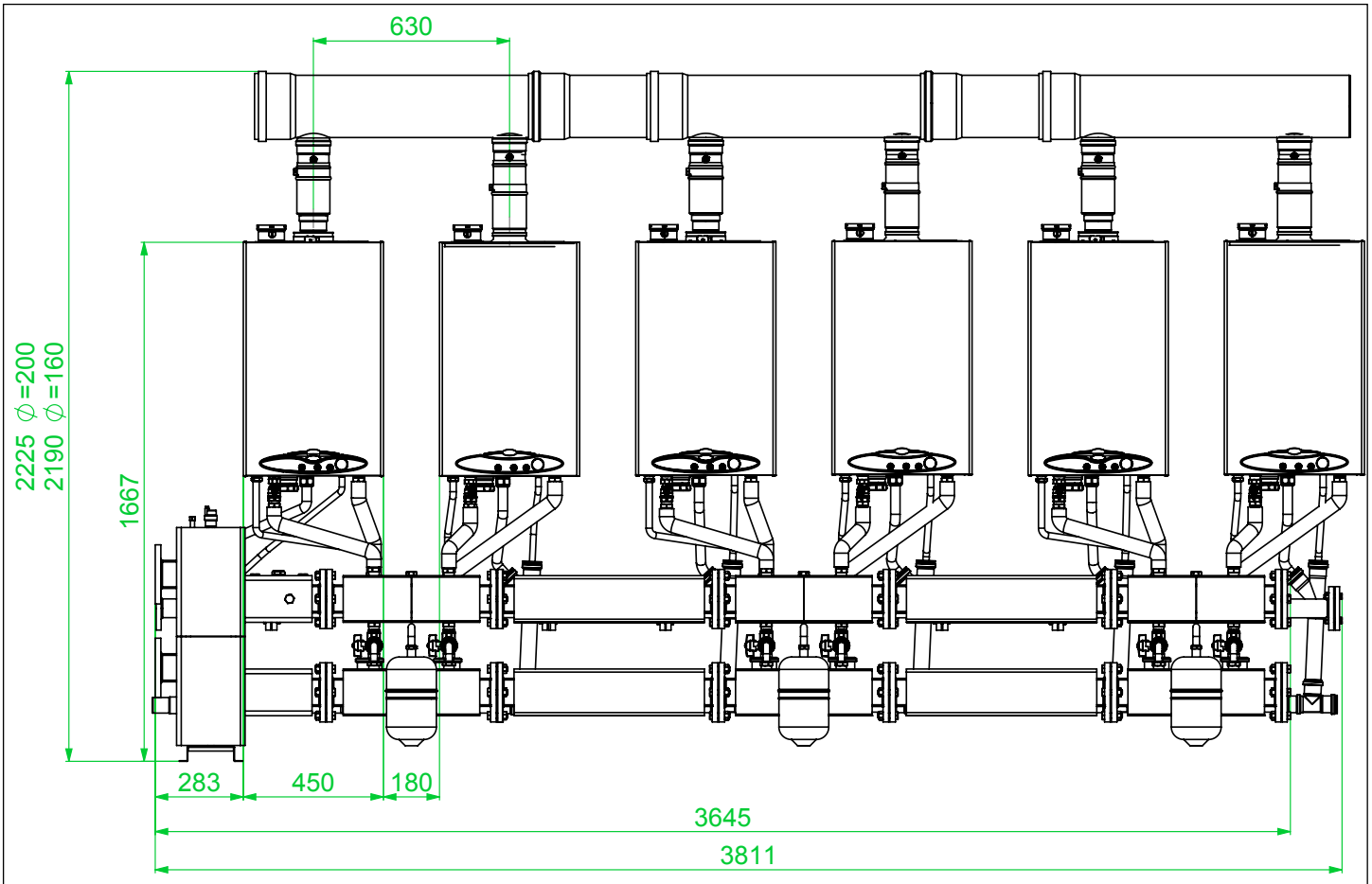
User interface

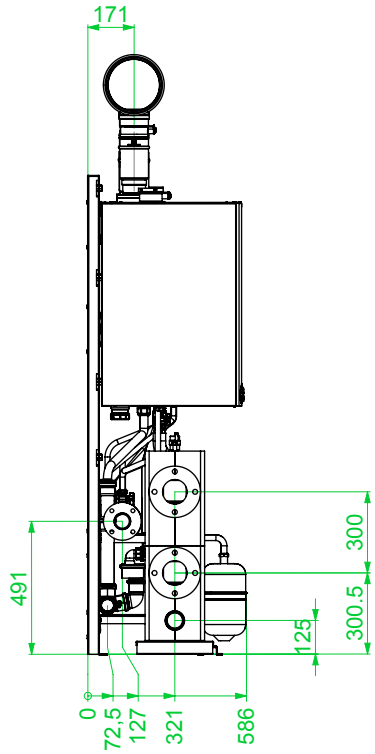
- On each boiler, Liquid crystal display showing that boiler operating status
- LCD display integrated in the system's control unit to show the system's operation
- Mode selector: RESET, OFF, WINTER
- Water pressure gauge

Operating features

- Electronic flame modulation in CH mode with timer-controlled rising ramp (50 seconds)
- Flow antifreeze function: ON at 5°C; OFF at 30°C or after 15 minutes of operation if CH temperature >5°C
- Water heater antifreeze function (if the boiler is connected to a separate water heater): ON at 5°C; OFF at 10°C or after 15 minutes of operation
- Timer-controlled chimney-sweep function: 15 minutes
- Ignition flame propagation function
- Timer-controlled ambient thermostat: 240 seconds with flow temperature >40°C
- Pump post-circulation function in CH, antifreeze and chimney-sweep modes
- Post-ventilation safety function: ON at 95°C, OFF at 90°C
- Pump anti-seize function: 180-second operation after 24 hours of boiler inactivity
- Provision for connection to a room thermostat (optional)
- Provision for operation with an external probe

2.2. Dimensions and couplings

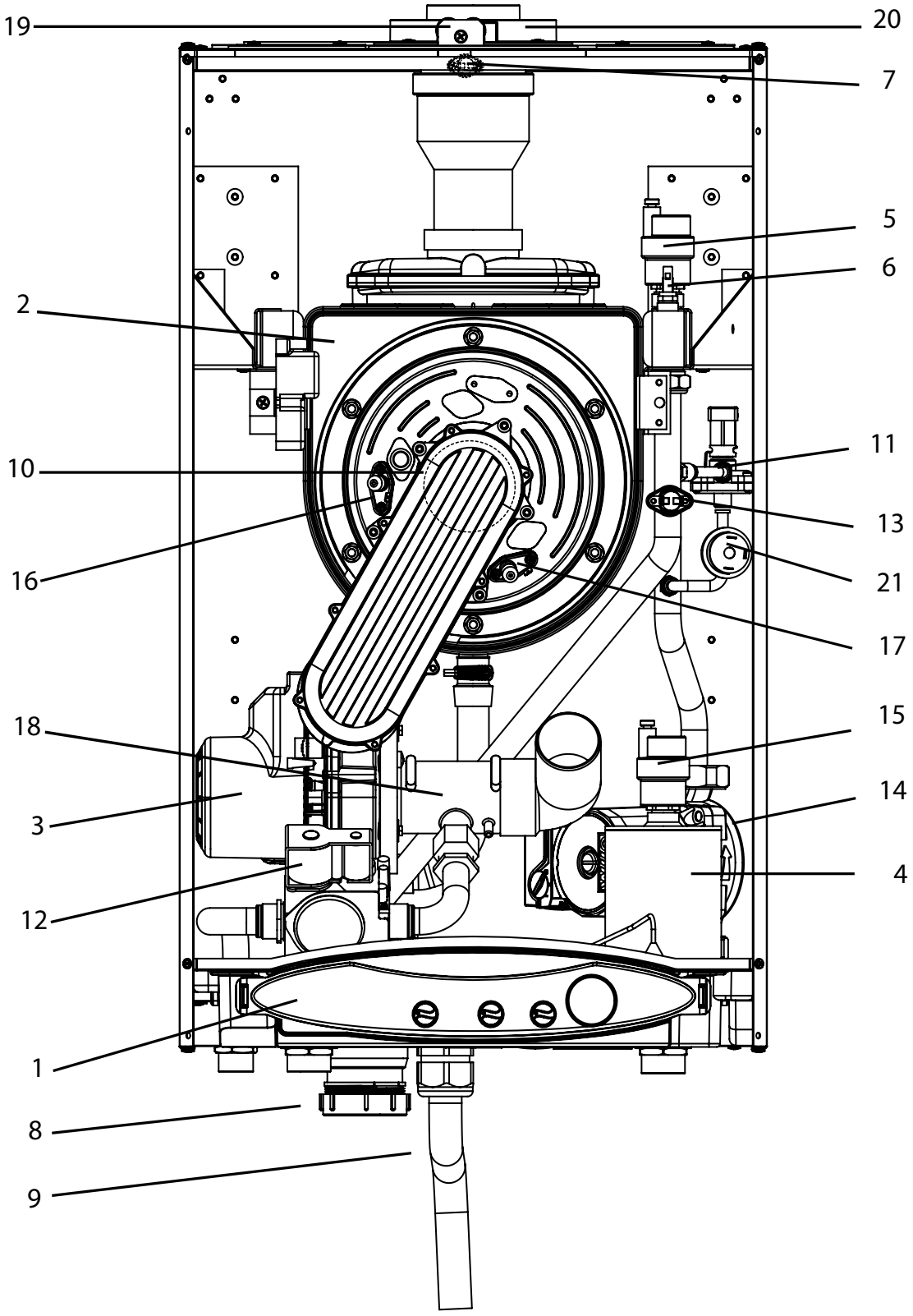




	DESCRIPTION	COUPLINGS
M	Flow	DN 80 PN 6
R	Return	DN 80 PN 6
G	Gas	DN 50 PN 6
SC	Condensate drain	Ø 50
SS	Purge drain	G 1 1/2 F

pic. 5

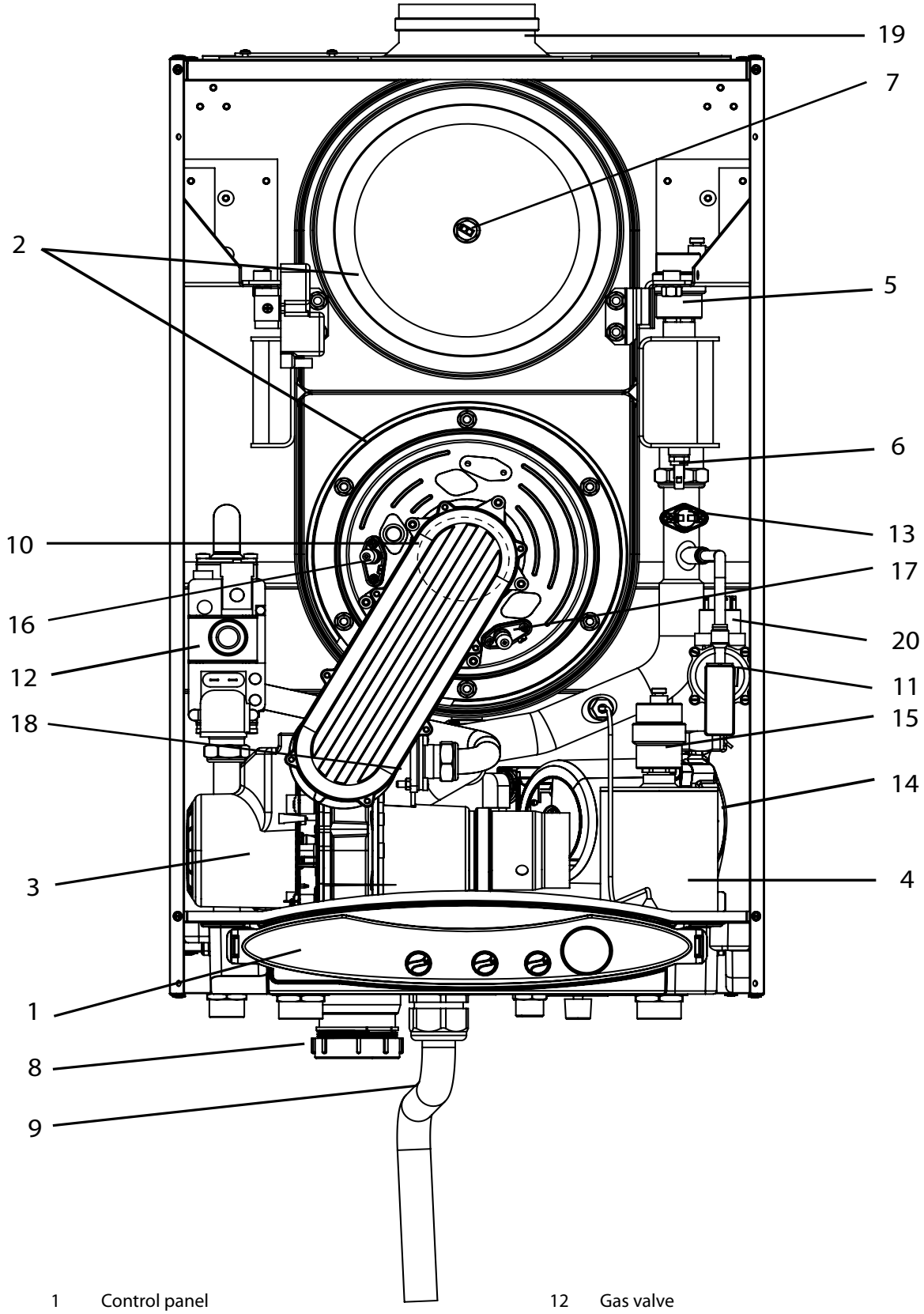
2.3. Main components for the KR 55



1	Control panel	12	Gas valve
2	Heat exchanger	13	Safety thermostat
3	Flue gas fan	14	Circulating pump
4	Air separator	15	Deaerator on air separator
5	Deaerator on heat exchanger	16	Ignition electrode
6	CH temperature probe	17	Detection electrode
7	Flue gas thermostat	18	Air/gas mixer
8	Inspection plug on condensate trap	19	Air/flue gas test intake
9	Condensate drain pipe	20	Air/flue gas suction tower
10	Pre-mixing burner	21	Water pressure switch
11	Differential water pressure switch		

pic. 6

2.4. Main components for the KR 85



1	Control panel
2	Heat exchanger
3	Flue gas fan
4	Air separator
5	Deaerator on heat exchanger
6	CH temperature probe
7	Flue gas thermostat
8	Inspection plug on condensate trap
9	Condensate drain pipe
10	Pre-mixing burner
11	Differential water pressure switch
12	Gas valve
13	Safety thermostat
14	Circulating pump
15	Deaertator on air separator
16	Ignition electrode
17	Detection electrode
18	Air/gas mixer
19	Air/flue gas suction tower
20	Water pressure switch

pic. 7

2.5. Operating data

Burner pressures must be verified after a three minute boiler operation time.
The figures refer to the G20 methane gas with feed pressure at 20 mbar

Model	Max. CH input [kW]	CH output (80-60°C) [kW]		CH output (50-30°C) [kW]		Heat input of the single boiler	Diaphragm diameter [mm]	Flue gas CO_2 [%]
		min	max	min	max			
KR 110	110	14.1	107.0	15.7	117.6	2 pcs. 55kW	See table 4	See table 4
KR 140	140	14.1	136.2	15.7	149.2	1 pc. 55kW, 1 pc. 85kW	See table 4	See table 4
KR 170	170	20.3	165.4	22.6	180.8	2 pcs. 85kW	See table 4	See table 4
KR 220	220	14.1	214	15.7	235.2	4 pcs. 55kW	See table 4	See table 4
KR 250	250	14.1	243.2	15.7	266.8	3 pcs. 55kW, 1 pc. 85kW	See table 4	See table 4
KR 280	280	14.1	272.4	15.7	298.4	2 pcs. 55kW, 2 pcs. 85kW	See table 4	See table 4
KR 310	310	14.1	301.6	15.7	330.0	1 pc. 55kW, 3 pcs. 85kW	See table 4	See table 4
KR 340	340	20.3	330.8	22.6	361.6	4 pcs. 85kW	See table 4	See table 4
KR 360	360	14.1	350.2	15.7	384.4	5 pcs. 55kW, 1 pc. 85kW	See table 4	See table 4
KR 390	390	14.1	379.4	15.7	416.0	4 pcs. 55kW, 2 pcs. 85kW	See table 4	See table 4
KR 420	420	14.1	408.6	15.7	447.6	3 pcs. 55kW, 3 pcs. 85kW	See table 4	See table 4
KR 450	450	14.1	437.8	15.7	479.2	2 pcs. 55kW, 4 pcs. 85kW	See table 4	See table 4
KR 480	480	14.1	467.0	15.7	510.8	1 pc. 55kW, 5 pcs. 85kW	See table 4	See table 4
KR 510	510	20.3	496.2	22.6	542.4	6 pcs. 85kW	See table 4	See table 4

Table 3 - Calibration data

	Diaphragm diameter [mm]	Flue gas CO_2 [%]
KR 55 - G20	8.2	9
KR 85 - G20	10.3	9

Table 4 - Gas system specifications

2.6. General characteristics

		KR 110	KR 140	KR 170	KR 220	KR 250	KR 280	KR 310
Category	-	II2H3P	II2H3P	II2H3P	II2H3P	II2H3P	II2H3P	II2H3P
CH minimum pressure	bar	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CH maximum pressure	bar	4	4	4	4	4	4	4
CH maximum working temperature	°C	83	83	83	83	83	83	83
DHW maximum working temperature (*)	°C	62	62	62	62	62	62	62
Methane gas consumption at max. flow (**)	m^3/h	11.64	14.815	17.989	23.280	26.455	29.630	32.804
Power supply (voltage ~ frequency)	V ~ Hz	230 ~ 50						
Maximum input power	W	491	537	583	959	1005	1051	1097
Index of protection	IP	X4D	X4D	X4D	X4D	X4D	X4D	X4D

Table 5 - General specifications

(*) If the boiler is connected to a separate water heater with NTC probe 10 kΩ @ ß=3435
(**) Value referred to 15 °C - 1013 mbar

		KR 340	KR 360	KR 390	KR 420	KR 450	KR 480	KR 510
Category	-	II2H3P	II2H3P	II2H3P	II2H3P	II2H3P	II2H3P	II2H3P
CH minimum pressure	bar	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CH maximum pressure	bar	4	4	4	4	4	4	4
CH maximum working temperature	°C	83	83	83	83	83	83	83
DHW maximum working temperature (*)	°C	62	62	62	62	62	62	62
Methane gas consumption at max. flow (**)	m^3/h	35.979	38.095	41.270	44.444	47.619	50.794	53.968
Power supply (voltage ~ frequency)	V ~ Hz	230 ~ 50						
Maximum input power	W	1143	1473	1519	1565	1611	1657	1703
Index of protection	IP	X4D	X4D	X4D	X4D	X4D	X4D	X4D

Table 6 - General specifications

(*) If the boiler is connected to a separate water heater with NTC probe 10 kΩ @ ß=3435
(**) Value referred to 15 °C - 1013 mbar

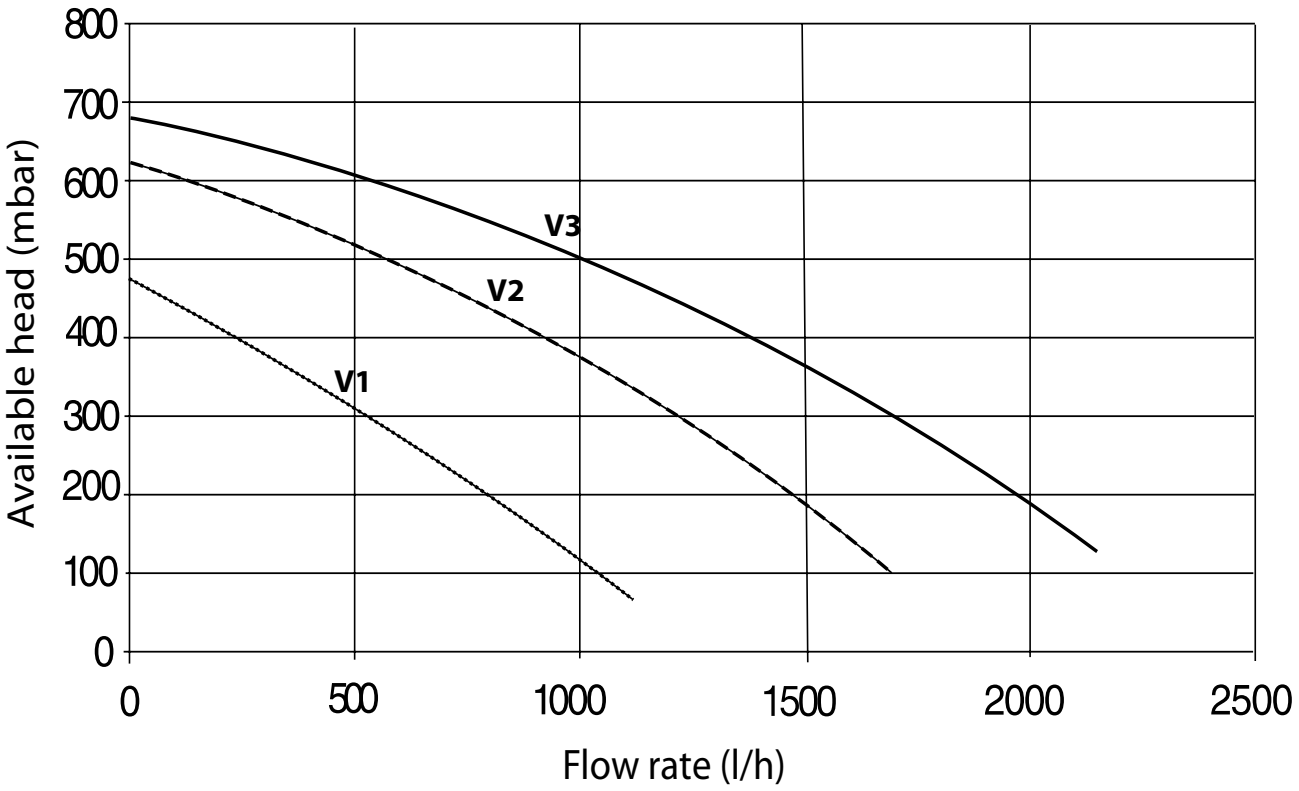
		KR 110	KR 140	KR 170	KR 220	KR 250	KR 280	KR 310
Casing heat loss with burner on Pmax	%	0.46	0.36	0.30	0.46	0.41	0.36	0.33
Casing heat loss with burner on Pmin	%	0.83	0.89	0.93	0.83	0.86	0.89	0.91
Casing heat loss with burner off	%	0.36	0.43	0.48	0.36	0.40	0.43	0.46
Chimney heat loss with burner on Pmax	%	2.04	2.14	2.20	2.04	2.09	2.14	2.17
Chimney heat loss with burner on Pmin	%	1.89	1.83	1.79	1.89	1.86	1.83	1.81
Flue gas system mass flow rate Pmax	g/s	50.20	63.80	77.40	100.4	114.0	127.6	141.2
Flue gas system mass flow rate Pmin	g/s	6.60	6.60	9.60	6.60	6.60	6.60	6.60
Flue gas - air temperature Pmax	°C	44.00	45.82	47.00	44.00	45.02	45.82	46.47
Flue gas - air temperature Pmin	°C	39.00	37.18	36.00	39.00	37.98	37.18	36.53
Available pumping head Pmax	Pa	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Available pumping head Pmin	Pa	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Maximum heat output efficiency rating (60/80°C)	%	97.3	97.3	97.3	97.3	97.3	97.3	97.3
Maximum heat output efficiency rating (30/50°C)	%	107.0	106.7	106.4	107.0	106.9	106.7	106.6
Minimum heat output efficiency rating (60/80°C)	%	97.0	97.2	97.3	97.0	97.1	97.2	97.2
Minimum heat output efficiency rating (30/50°C)	%	108.1	107.9	107.7	108.1	108.0	107.9	107.8
30% heat output efficiency rating	%	108.9	108.7	108.5	108.9	108.8	108.7	108.6
Flue gas collector diameter	mm	160	160	160	160	160	160	160
Efficiency rating (according to 92/42/CEE)	-	★★★★						
NO_x emission class	-	5						

Table 7 - Combustion data

		KR 340	KR 360	KR 390	KR 420	KR 450	KR 480	KR 510
Casing heat loss with burner on Pmax	%	0.30	0.42	0.39	0.36	0.34	0.32	0.30
Casing heat loss with burner on Pmin	%	0.93	0.85	0.87	0.89	0.91	0.92	0.93
Casing heat loss with burner off	%	0.48	0.39	0.41	0.43	0.45	0.47	0.48
Chimney heat loss with burner on Pmax	%	2.20	2.08	2.11	2.14	2.16	2.18	2.20
Chimney heat loss with burner on Pmin	%	1.79	1.87	1.85	1.83	1.81	1.80	1.79
Flue gas system mass flow rate Pmax	g/s	154.8	164.2	177.8	191.4	205.0	218.6	232.2
Flue gas system mass flow rate Pmin	g/s	9.60	6.60	6.60	6.60	6.60	6.60	9.60
Flue gas - air temperature Pmax	°C	47.00	44.71	45.31	45.82	46.27	46.66	47.00
Flue gas - air temperature Pmin	°C	36.00	38.29	37.69	37.18	36.73	36.34	36.00
Available pumping head Pmax	Pa	90.0	163.0	163.0	163.0	163.0	163.0	163.0
Available pumping head Pmin	Pa	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Maximum heat output efficiency rating (60/80°C)	%	97.3	97.3	97.3	97.3	97.3	97.3	97.3
Maximum heat output efficiency rating (30/50°C)	%	106.4	106.9	106.8	106.7	106.6	106.5	106.4
Minimum heat output efficiency rating (60/80°C)	%	97.3	97.1	97.1	97.2	97.2	97.3	97.3
Minimum heat output efficiency rating (30/50°C)	%	107.7	108.0	108.0	107.9	107.8	107.8	107.7
30% heat output efficiency rating	%	108.5	108.8	108.8	108.7	108.6	108.6	108.5
Flue gas collector diameter	mm	160	200	200	200	200	200	200
Efficiency rating (according to 92/42/CEE)	-	★★★★						
NO_x emission class	-	5						

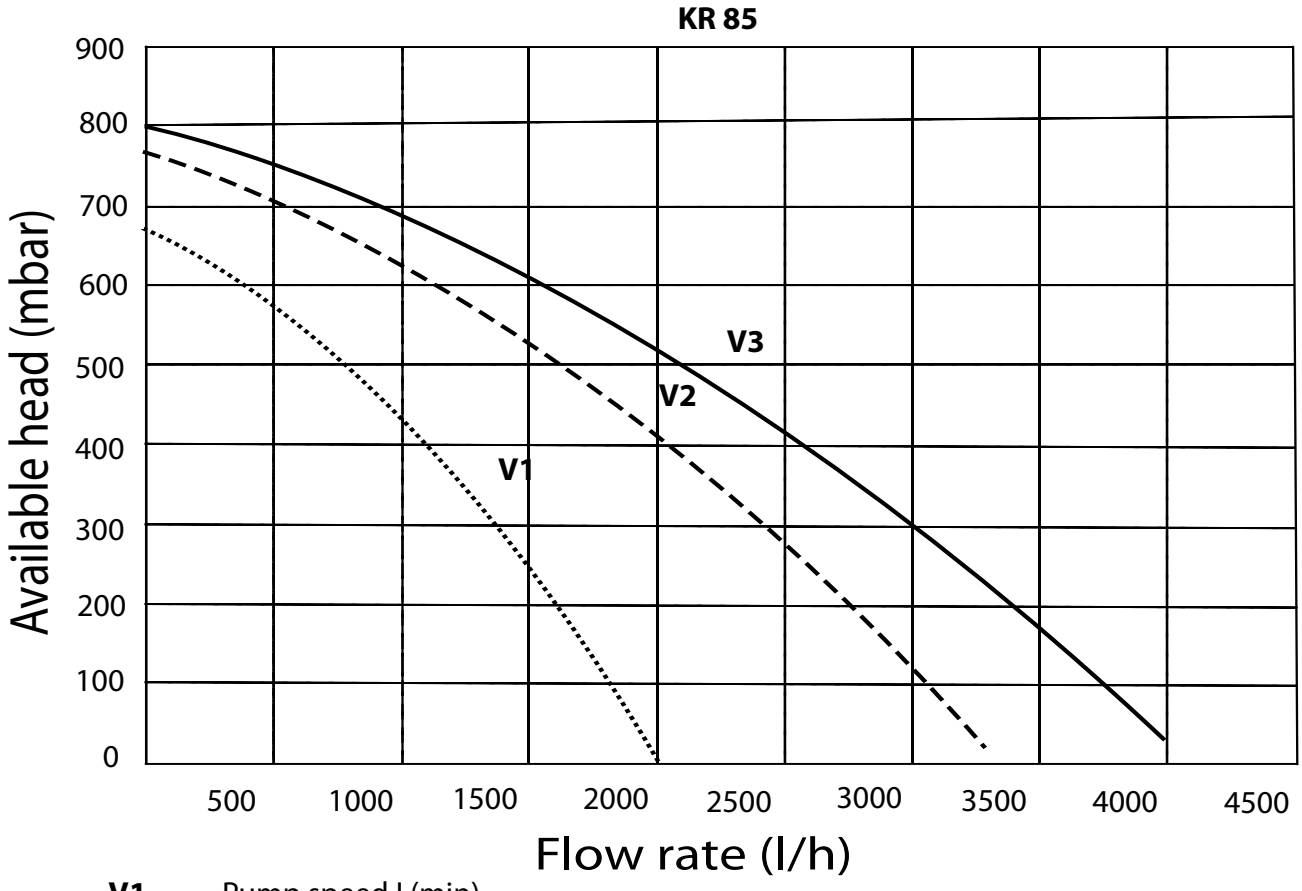
Table 8 - Combustion data

2.7. Pumping head



V1 Pump speed I (min)
V2 Pump speed II
V3 Pump speed III (max)

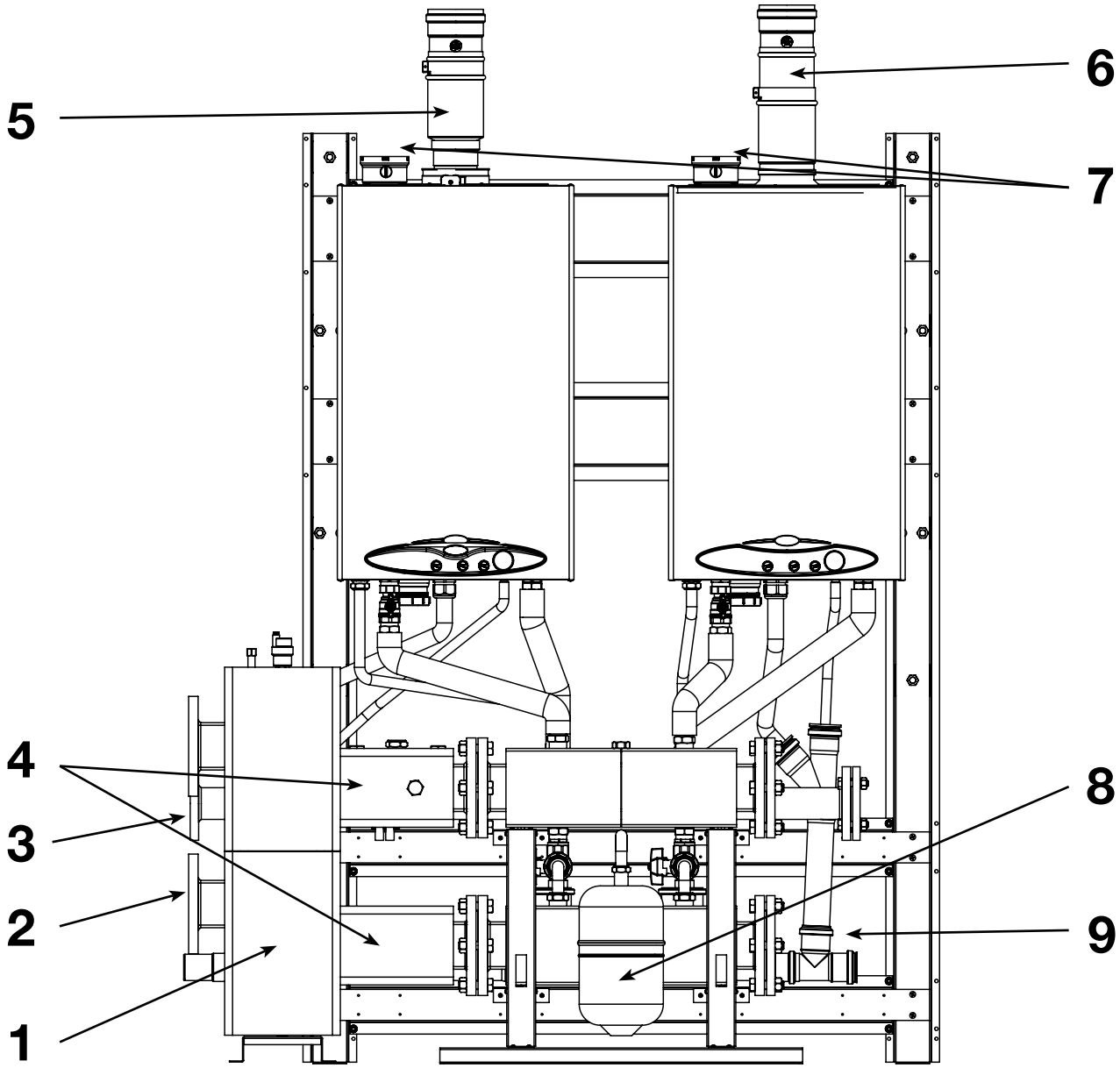
pic. 8



V1 Pump speed I (min)
V2 Pump speed II
V3 Pump speed III (max)

pic. 9

HEADER MODULE



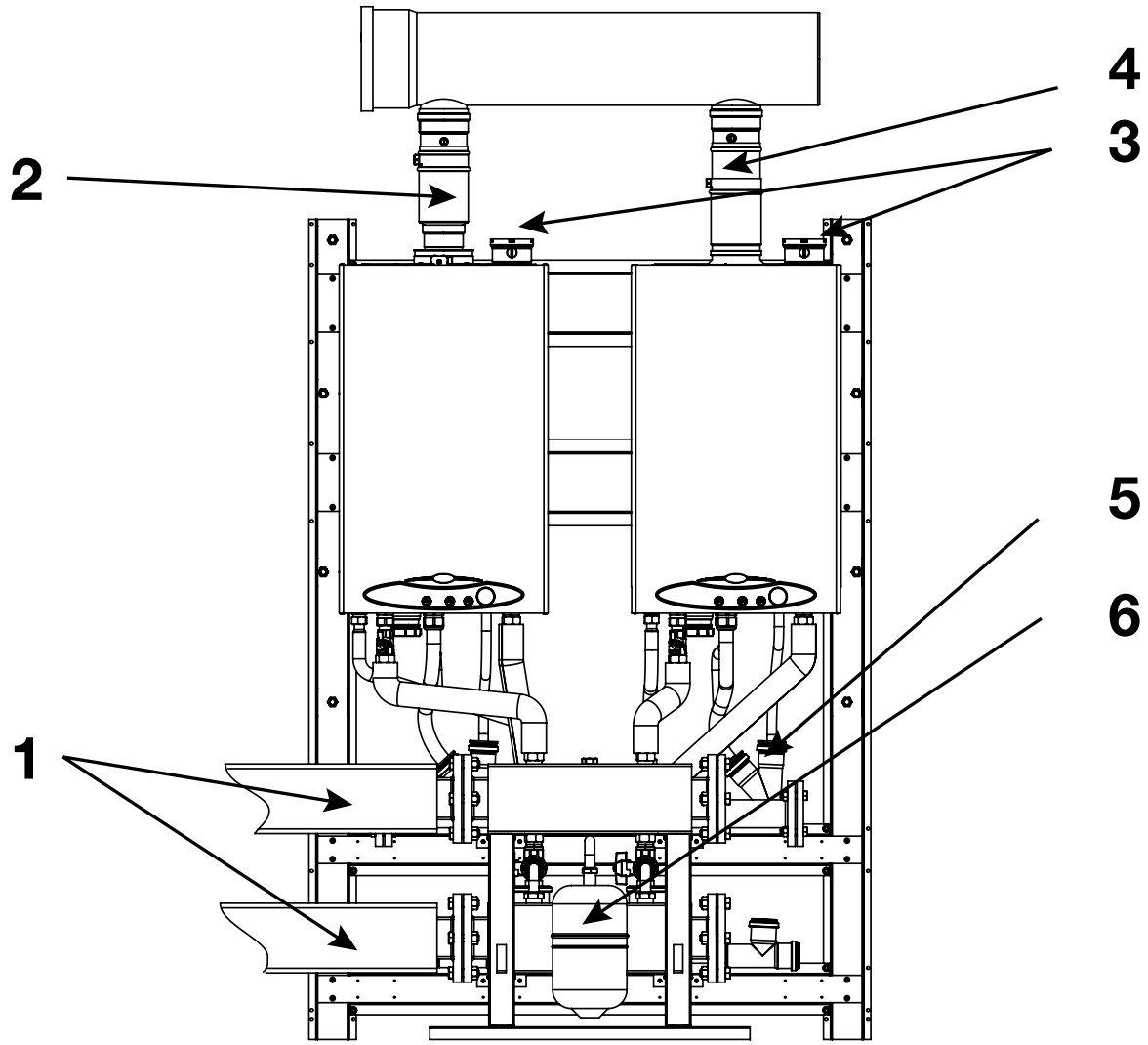
1 - Hydraulic separator
2 - Flanged piping
3 - Gas manifold
4 - Hydraulic manifolds
5 - Flue gas discharge - module 1
6 - Flue gas discharge - module 2
7 - Ventilation chimney
8 - Expansion vessel of the unit
9 - Condensation drain pipes and for system water from the safety valve

pic. 10

The header module houses the hydraulic separator and all the safety accessories.

The header module can be supplied with a hydraulic separator, right or left, depending on the installation site.

EXPANSION MODULE



1 - Hydraulic manifolds
2 - Flue gas discharge - module 1
3 - Chimney Ventilation
4 - Flue gas discharge - module 2
5 - Condensation drain pipes and for system water from the safety valve
6 - Expansion vessel of the unit

pic. 11

The expansion modules cannot be provided separately from the header module.

3. Instructions for the fitter

3.1. Installation standards

This is an II2H3P category boiler and it must be installed in compliance with the laws and regulations in force in the country of installation

3.2. Installation

Accessories and spare parts for installation and service procedures must be supplied by the Manufacturer.
Correct heating system performance cannot be guaranteed if non-original accessories and spare parts are used.

3.2.1. Packagings

Each individual boiler, the hydraulic part of the header module, and any expansion modules, rack (optional) and electrical panel are all supplied in individual cardboard boxes.
All the packaging materials can be recycled and should be disposed of accordingly.
Keep the packaging out of the reach of children, as it may cause a hazard.
The Manufacturer cannot be held liable for damage or injury caused by failure to comply with the above instructions.

Contents of the box:
• this manual;
• manufacturer's certification of hydraulic test;
• flue gas check valves.

3.2.2. Choosing where to install the boilers

The boilers must be installed in areas used exclusively for heating installations. The boilers must in every case be installed so that they will not be exposed to shocks or tampering.

3.2.2.1. Height of the installation area

The height of the installation area must meet the following minimum dimensions, depending on the overall heat output:
- Not above 116 kW: 2.00 m;
- Above 116 kW to 350 kW: 2.30 m;
- Above 350 kW and up to 580 kW: 2.60 m.

3.2.3. Air vents in the installation area

The area must be equipped with one or more permanent ventilation openings on the external walls. Protection of the vents is allowed with metal grids or nets and/or finned trusses, on the condition that they do not reduce the net area of ventilation. The air vents must be built and located so as to avoid the formation of gas pockets, whatever the shape of the cover.

3.2.4. Positioning the boiler

For positioning the wall structure keep in mind:

• the CH connections (flow **M** and return **R**);
• connection to the gas mains (**G**);
• connection to the condensate drain (**S**);
• connections to the air intake and flue gas discharge pipes.

according to the dimensions shown in pic. 5.

3.2.5. Antifreeze protection

The boiler is equipped as standard with an antifreeze function, which operates the pump and the burner upon the occurrence of the following situations:

• If the external sensor detects a temperature below 0° C (Default value within the range -15° C to 5° C) the module switches on up to the nominal temperature. The nominal temperature varies depending on the outdoor, measured by the outdoor probe, from the theoretical room temperature (5° C by default), and from the selected heating curve.
• If the manifold sensor detects a temperature below 5° C (the default) the module switches on up to reaching a temperature of 20° C on the manifold.
• If the the flow probes on individual boilers detect a temperature below 5° C those boilers switch on until reaching a temperature of 30° C or after 15 minutes of operation.

The antifreeze operation is assured only if:
• the boiler is connected to the gas and electric supply;
• the boiler is constantly powered;
• the boiler is not locked out due to a failure in switching on

In a case where gas supply is lacking, or the boiler goes off due to a failure in switching on, the device can reach the freezing point. To avoid this risk it is necessary to protect the heating system from freezing by adding an antifreeze liquid in compliance with the manufacturer's instructions.

3.2.6. Installing the boiler

The whole system must be cleaned thoroughly before the boiler is connected to the pipes in the central heating system.

Before starting up a NEW system, clean it thoroughly to remove any metal residues from the construction or welding process, and any oil or grease present as this could get into the boiler and damage it.
Before starting up a MODERNIZED system (additional radiators, replacement of the boiler, etc.), clean it thoroughly to remove any sludge and foreign bodies.
To do this, use appropriate non-acidic products that can be bought on the market.
Do not use solvents as they would damage the components.

In any (new or modernized) heating system, specific anticorrosion products for multi-metal systems must be added to the water in the correct concentration. This will form a protective film on the internal metal surfaces.
The Manufacturer cannot be held liable for damage or injury caused by failure to comply with the above instructions.

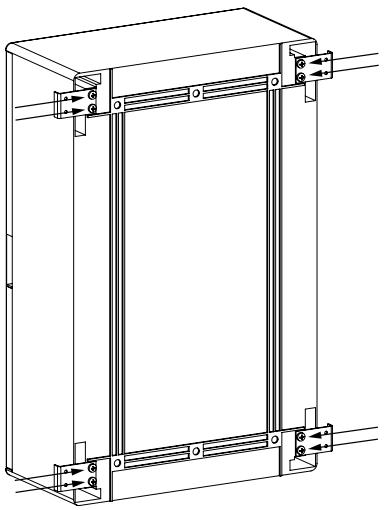
In any type of system it is important to mount an inspectable filter (type Y), with Ø 0.4 mm mesh in the return line to the boiler.

3.2.6.1. Fixing the control unit to the wall

1

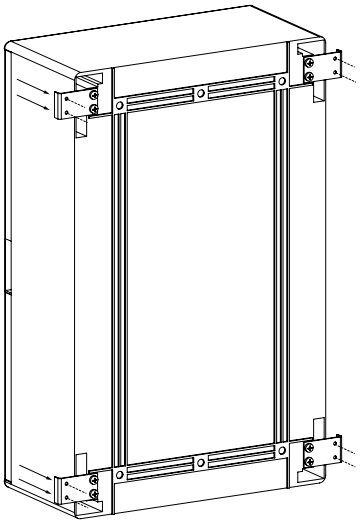
Mount the 4 brackets (supplied) to the electric cabinet using the 8 M6 screws.

REAR of the ELECTRIC CABINET



2

Fasten the electric cabinet to the wall using appropriate hardware (anchor).

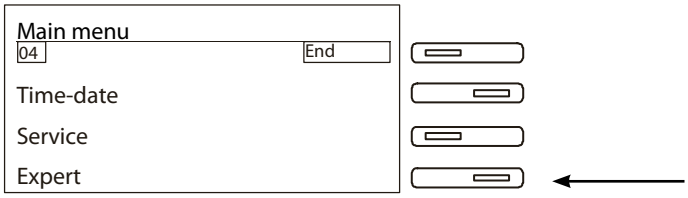


3.2.7. Control unit setting

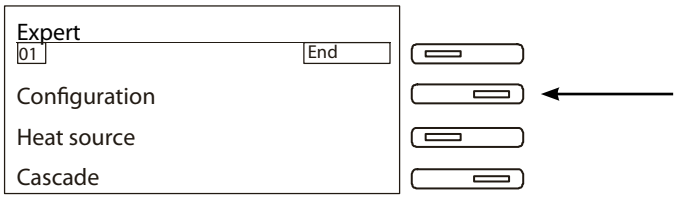
When starting up the system for the first time, it is advisable to set the control unit according to the following instructions.

System configuration

1. Press the HOME button to access the main menu of the control unit. Scroll through the main menu by turning the knob. Press the F key corresponding to the EXPERT line.



2. From the technical submenu, press the F key corresponding to the CONFIGURATION line.

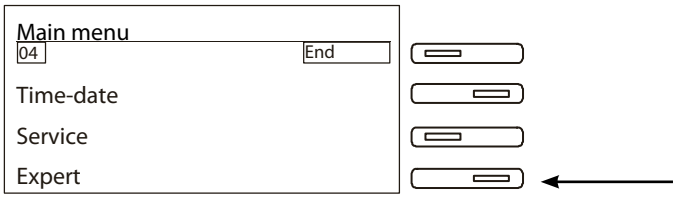


Enter the following recommended values in the configuration submenu:

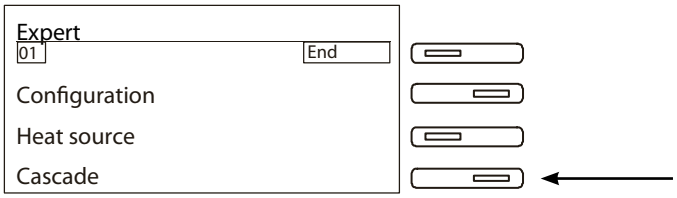
Description	Set value	Mandatory value	
Change code	0000	0000	
BUS ID 1	01	01	
BUS ID 2	02	02	
BUS Termination	ON	Off	←
eBUS supply	ON	Off	←
Time master	Off	Off	
Plant select	----	----	
HS1 Type	03	06 (modulating boiler)	←
HS 1 BUS	00	01	←
HS2 Type	00	00	
Storage HS2	00	00	
Buffer	00	00	
Cool Operation	Off	Off	
F15 Function	00	00	
Sensor	Sens. 5k	Sens. 5k	

Cascade control values

1. Press the HOME button to access the control unit main menu. Turn the knob to scroll through the main menu.
Press the F key corresponding to EXPERT.



2. From the technical submenu, press the F key corresponding to the CASCADE line.



Enter the following recommended values in the cascade submenu:

Description	Set value	Mandatory value
detected HSS		
Capacity/Stage	00 kW	Enter thermal output for each boiler
BUS Scan	Off	Off
min Mod Cascade	00	00
DHW HS	00	00
Control Deviation		
Desired Output		
Switch value		
Block Time		
Max T-Module	90 °C	90 °C
Dyn Upward	100 K	100 K
Dyn Downward	100 K	100 K
Reset time	50	50
Modulation max	80%	15%
Modulation min	30%	15%
Min Mod HS	30%	15%
Modulat DHW	80%	80%
Sequence 1	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
Sequence 2	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1
Sequ change	0 hours	0 hours
Block time	00 min	00 min

3.2.8. Testing combustion efficiency

3.2.8.1. Chimney-sweep function

The boiler has a chimney-sweep function to be used when testing combustion efficiency and regulating the burner.

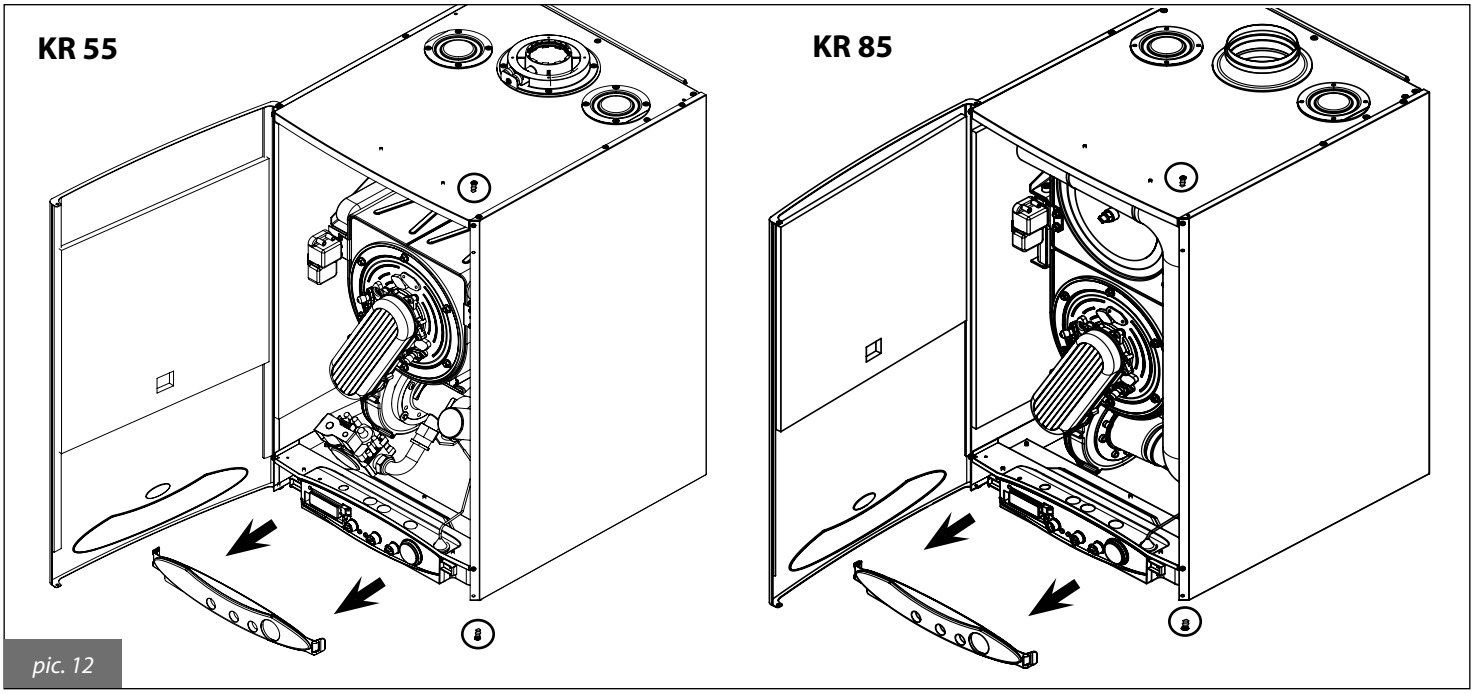
To activate this function, open the front part of the casing for access to the controls. To do this, proceed as follows:
• Unscrew two of the four screws securing the casing – either those on the left or those on the right.
• Open the casing.
• Remove the control panel cover by pulling the hooks on either side outwards and pulling the cover towards you (pic. 12).

The control panel layout is shown in pic. 13.

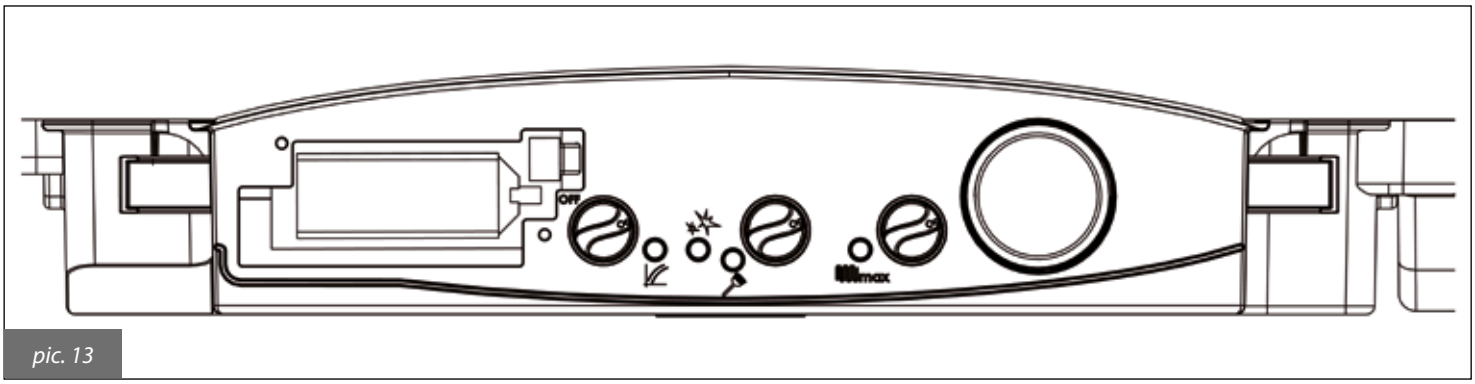
With selector **2** (pic. 1) on WINTER, the room thermostat (if there is one) ON, and the boiler in operation, press the chimney-sweep button (pic. 13) with a small screwdriver for five seconds. The boiler turns off, performs the ignition sequence and runs at a preset stable heat output corresponding to the maximum one set with button **max** (pic. 13).

The chimney-sweep function operates for 15 minutes.

To exit chimney-sweep mode, turn selector **2** to any position other than WINTER and then to the desired setting



pic. 12



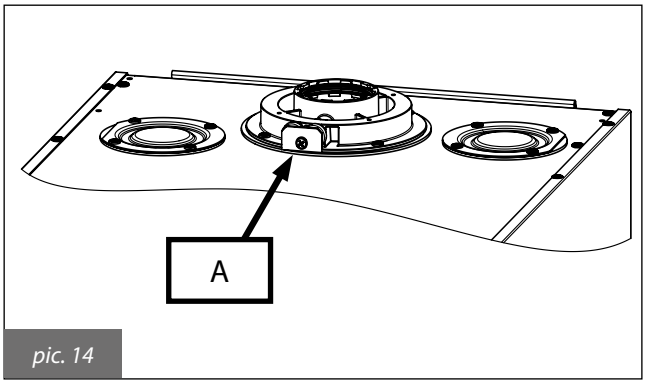
pic. 13

3.2.8.2. Measurement procedure

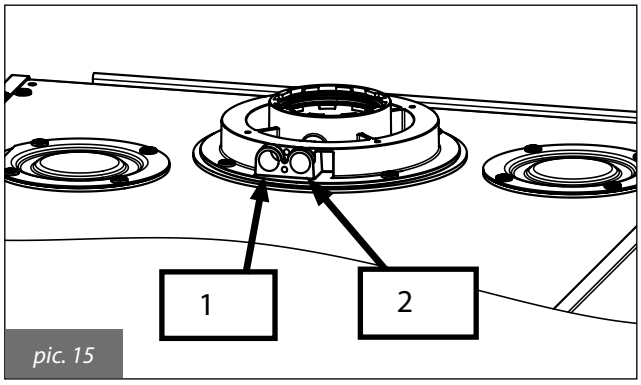
KR 55
The boiler is equipped with a tower allowing for connection of the air intake and flue gas discharge pipes (figs. 14 and 15).
The tower comes with two openings for direct access to the combustion air and flue gas pipes (pic. 15).
Remove the caps (**A**) from these openings (pic. 14) before measurements.

The following measurements must be made to determine combustion efficiency:
• measure combustion air taken from opening **1** (pic. 15);
• measure flue gas temperature and CO_2 from opening **2** (pic. 15).

The boiler must be working at a steady rate (about ten minutes after entering the chimney-sweep mode).



pic. 14



pic. 15

KR 85
The boiler is not equipped with a tower allowing for connection of the air intake and flue gas discharge pipes.
In this case combustion air, flue gas temperature and CO_2 are measured at the openings for the accessory pipes, or as close as possible to the air intake and flue gas discharge points on the boiler.

3.2.9. Connecting to the gas mains

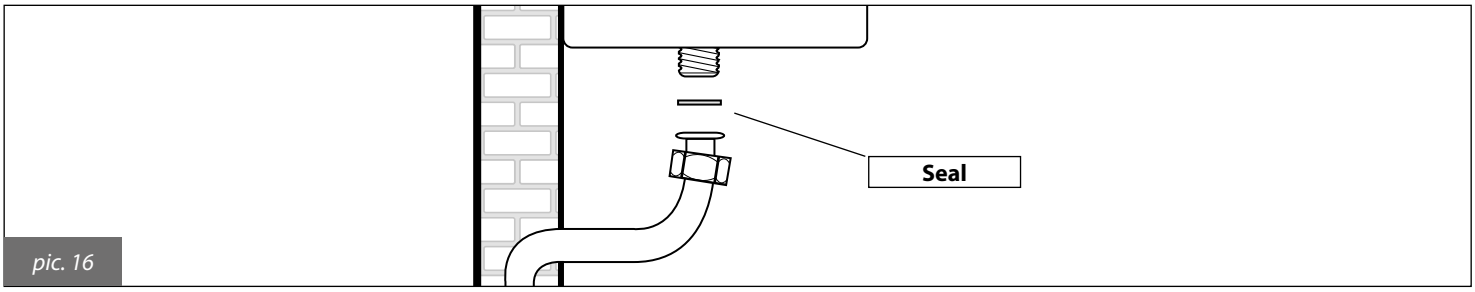
The cross-section of the pipe depends on the length of the pipe, the layout pattern and the gas flow rate. This means the pipe must be sized accordingly.

Gas connections must comply with the applicable rules and regulations in the country of installation, which are intended as an integral part of this handbook.

Please note that before activating an indoor gas supply system and before connecting it to a meter, it must be checked for tightness.

If any part of the system is not visible, the gas leak test must be performed before the pipe is covered.
The test must NOT be performed with combustible gas. Use air or nitrogen.
If gas is present in the piping, do not use a naked flame to look for leaks. Use a specific product available on the market.

When connecting the boiler to the gas supply fitting, an appropriately sized seal made of suitable material MUST be used (pic. 16). Hemp, Teflon tape or the like are NOT SUITABLE for use with gas fittings.



pic. 16

3.2.10. Connecting the control cabinet to the power mains

The control cabinet comes with three-pole power cable, one end of which must be connected to the 0CIRCSTA16 interconnection board, as shown in pic. 17, and secured by a clamping system.

The boiler must be connected to a 230V-50Hz mains supply.
When connecting the boiler, keep to the correct phase / neutral polarity sequence.

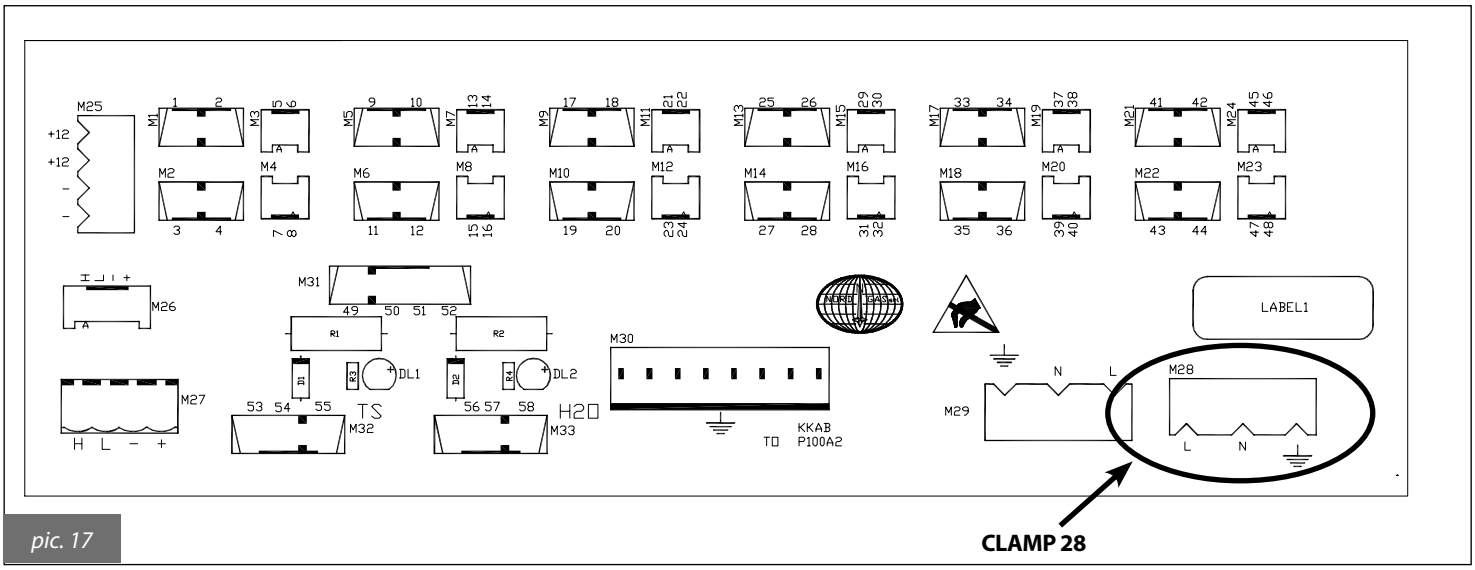
The installation must comply with the applicable laws in the country of installation, which are intended as an integral part of this handbook.

An easy-access double pole switch with at least 3mm between the contacts must be installed before the boiler to enable the power supply to be cut off, so that maintenance can be performed in complete safety.

The power supply to the boiler must be protected by a differential magnetic-thermal automatic switch of appropriate shut-down capacity.

The mains supply must be appropriately earthed.
This is a vital safety requirement. When in doubt, have the electrical system checked thoroughly by a qualified electrician.

The Manufacturer shall not be held liable for damage or injury resulting from failure to earth the system properly.
Gas, water and CH pipes must NOT be used as the primary earth source.



pic. 17

3.2. 11. Connecting the control cabinet to the boilers

The control cabinet comes with corrugated cables for connection to the boiler. Each cable is marked by a number. The boiler to which cable 1 is connected is recognised by the control unit as boiler 1. Connecting a cable to a boiler involves accessing the inside of the electrical box. To do this, proceed as follows:
- unscrew two of the four screws securing the case, either the two on the right and two on the left;
- open the case;
- remove the mask from the control panel by pressing on the hooks on the right and left and pulling outwards;
- unscrew the three screws securing the box to the base of the boiler.

Connect terminal M3 and the earth wire to the boiler board, and terminal M6 to the 0SCHEREM00 board, as shown in pic. 18.

Proceed as follows when replacing the electronic board of any boiler.
Connect the 0CREMOTO05 Remote Control (not supplied with the boiler) to terminal M6 of the 0SCHEREM00 board.
Press the key to switch the Remote Control to OFF.

Press Set and hold them down until TSP is displayed.

Press to confirm. The display reads TSP0. Turn knob to select TSP1.

Press to modify the value: the value associated with this parameter starts to flash.

Turn knob to modify the value and enter 196 for 55kW boilers and 202 for 85kW boilers.

Press to record the value. Turn knob to select TSP2.

Press to modify the value: the value associated with this parameter starts to flash.

Turn knob to modify the value and enter 61 for 55kW boilers and 59 for 85kW boilers.

Press to record the value. Turn knob to select TSP3.

Press to modify the value: the value associated with this parameter starts to flash.

Turn knob to modify the value and enter 90 for 55kW boilers and 105 for 85kW boilers.

Press to record the value. Turn knob to select TSP4.

Press to modify the value: the value associated with this parameter starts to flash.

Turn knob to modify the value and enter 100.

Press to record the value. Turn knob to select TSP7.

Press to modify the value: the value associated with this parameter starts to flash.

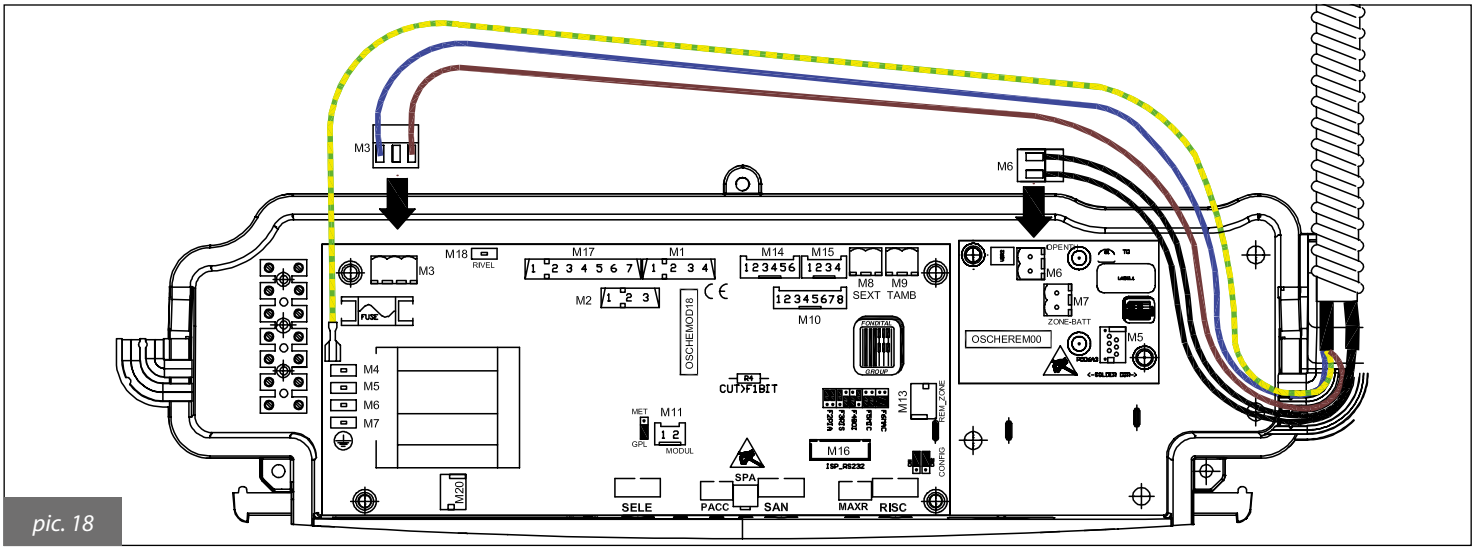
Turn knob to set the value to 0.

Press to record the value.

Press Reset to exit the configuration mode.

When you have done, disconnect the Remote Control. Then connect the wire from the control unit to terminal M6, as shown in pic. 18.

These instructions refer to a single boiler, so the whole procedure must repeated for each boiler of the system.



pic. 18

3.2.12. Connecting to the external probe and sliding temperature operation

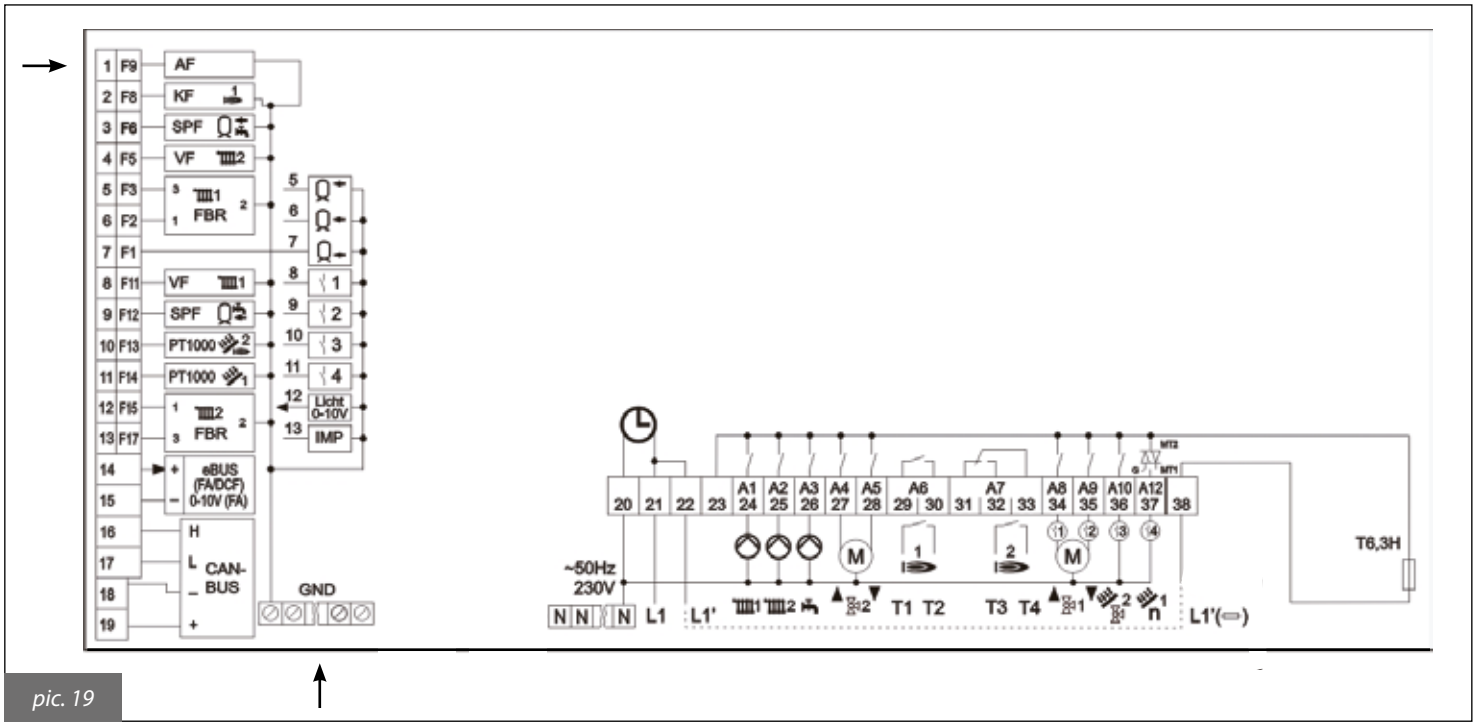
The boiler can be connected to an external temperature probe for sliding temperature operation.

Only original external temperature probes supplied by the manufacturer must be used.
If non-original external temperature probes are used, correct operation of the boiler cannot be guaranteed.

The external temperature probe must be connected by means of a double insulated wire, minimum cross-section 0.35 sq.mm.
The probe must be connected to terminals **"1 F9" and "GND" of the control unit** (pic. 19).
The temperature probe cables must NOT be sheathed together with power cables.

The temperature probe must be installed on an outside wall facing north or north-east, in a position protected from atmospheric agents.
Do not install near a window, ventilation openings or sources of heat.

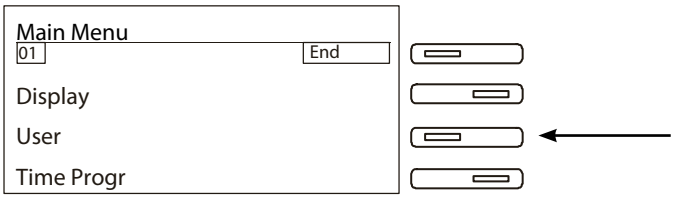
The external temperature probe automatically modifies the CH flow temperature in relation to:
• the outdoor temperature measured
• the thermoregulation curve selected
• the calculated room temperature selected.



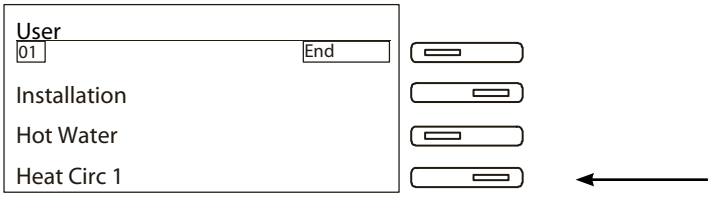
pic. 19

The thermoregulation curve is selected on the control unit.

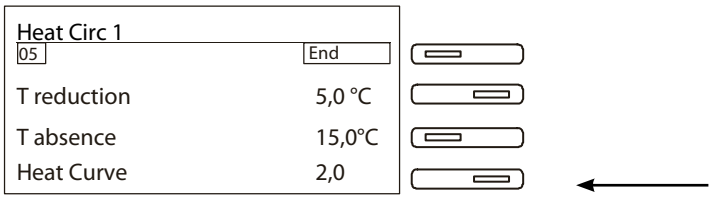
To set the heating curve, press the HOME button to call up the main menu. Use the knob to scroll through the menu. Press the F key corresponding to USER.



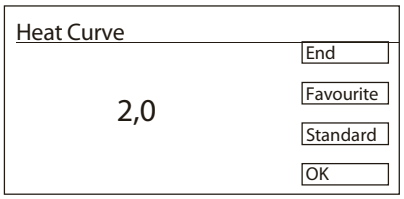
After entering the User submenu, press the F key corresponding to HEAT CIRC 1.

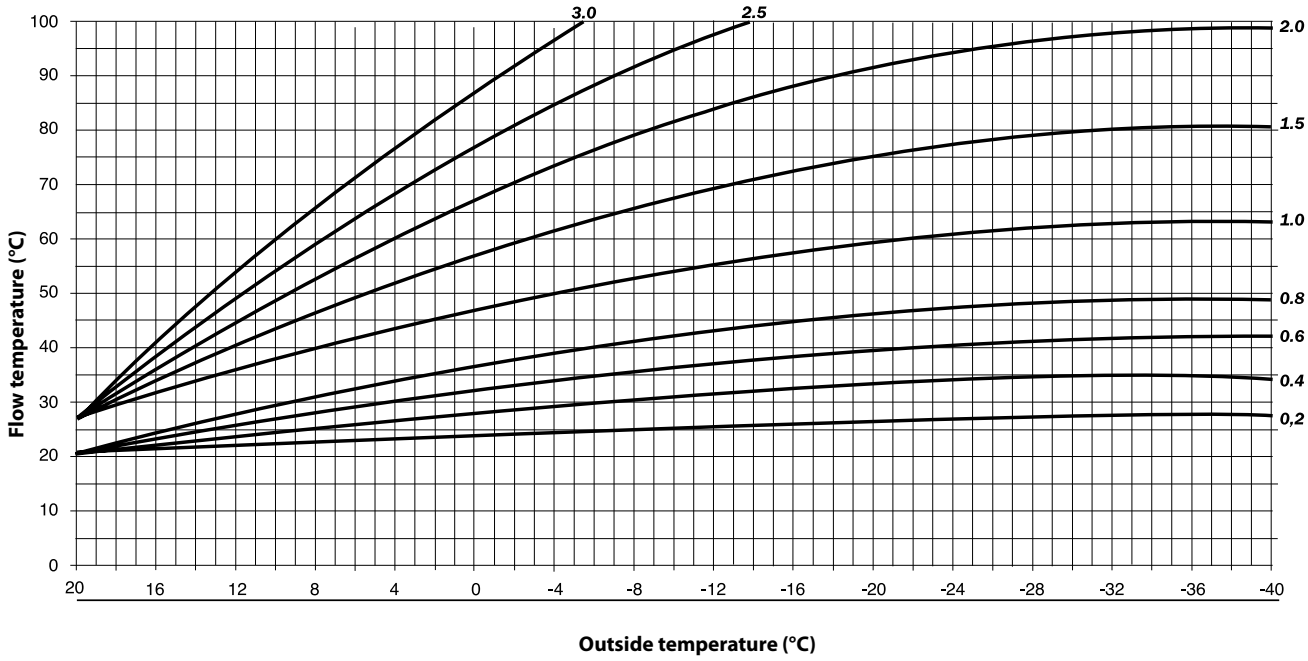


From the HEAT CIRC 1 submenu, press the F key corresponding to HEAT CURVE



Turn the knob clockwise or anticlockwise to set the temperature curve, then press the F key corresponding to OK.





pic. 20

The curves shown above, which refer to an room temperature of 20°C, are always limited by the maximum and minimum values of the operating range.

3.3. Filling the system

When all the boiler connections have been completed, the CH system can be filled with water.
This must be done with caution, following these steps in sequence.
• Open the air relief valve on all the radiators and check the efficiency of the automatic boiler valve.
• Gradually open the boiler external filling tap and check that any automatic air relief valves work efficiently.
• Close the relief valves as soon as water starts to come out.
• Check the water pressure on the pressure gauge of the header module: it has to be 1.5 bar.
• Close the filling device and bleed all the valves on the radiators to remove any residual air.
• Start the boilers and as soon as the system reaches the working temperature, stop the pump and repeat the air bleeding procedure.
• Allow the system to cool down, then restore water pressure to 1.5 bar.

IMPORTANT
As regards treating water in domestic heating systems, it is advisable to use specific products that are suitable for multi-metal systems, in order to optimize performance and safety, preserve these conditions over time, ensure regular operation of auxiliary equipment as well, and minimize energy consumption, in compliance with the applicable laws and standards.
Compliance with this standard is a legal requirement.
Use specific products suitable for multi-metal systems.

WARNING
The low water safety pressure switch will prevent the burner from starting up when the water pressure is below 0.4-0.6 bar.
A pressure of 1.5 bar is recommended in the CH system. If necessary, open the external filling tap.
This must be done with the system cold.
The pressure gauge on the control panel shows the water pressure in the system.

WARNING
If the boiler is not used for a long time, the pump may not work.
Before starting up the boiler, perform the following procedure to make sure that the pump works.
• Unscrew the protection bolt in the centre of the pump motor.
• Insert the tip of a screwdriver in the hole and turn the pump shaft clockwise.
• Then screw the protection bolt back in and check for water leaks.
When the protection bolt is removed, some water may flow out. Dry off any wet surfaces, before remounting the boiler casing.

3.4. Starting the boiler

3.4.1. Preliminary checks

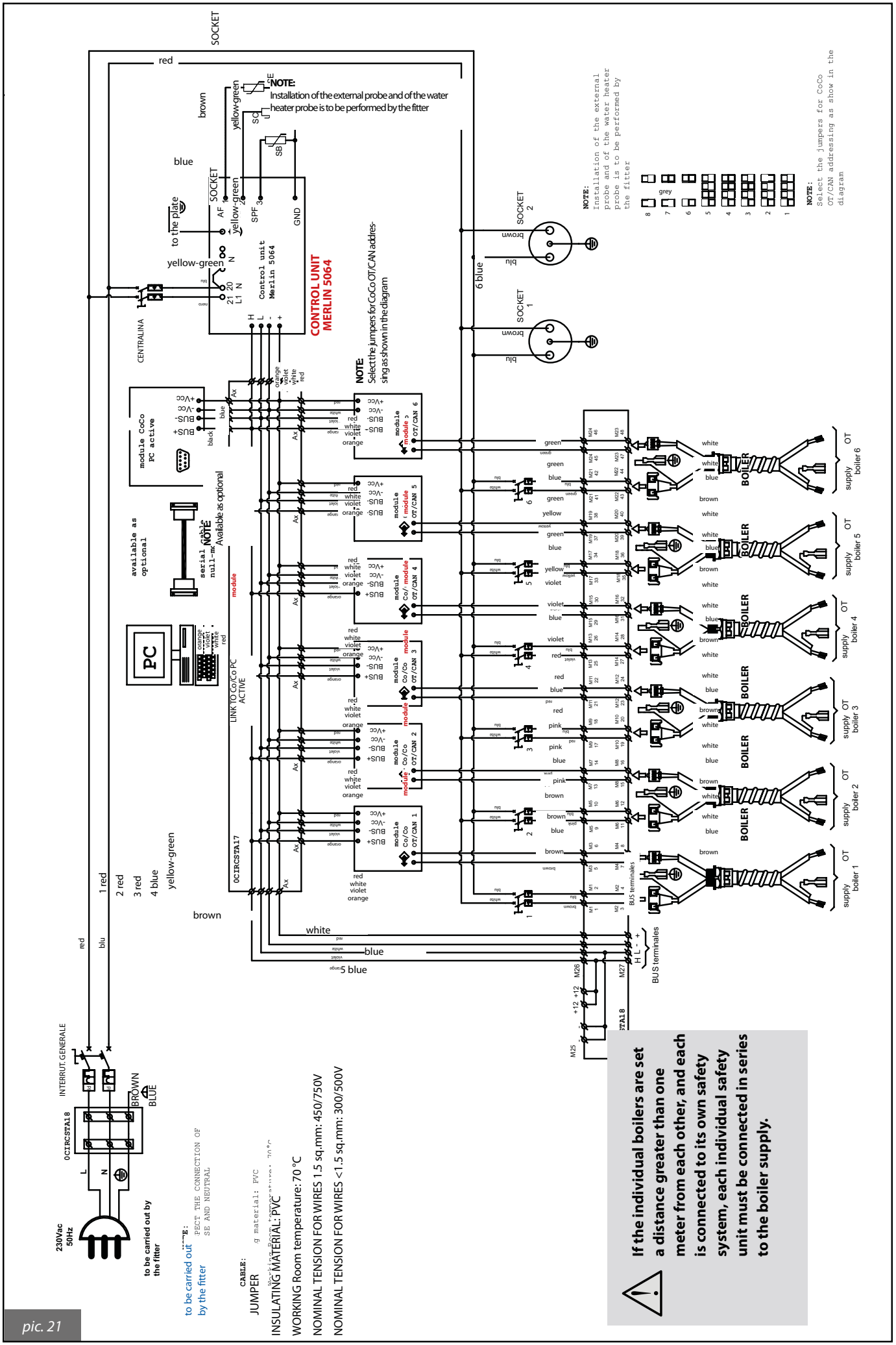
Before starting the boiler, perform the following checks:
• The flue gas exhaust pipe and terminal must be installed as instructed. When the boiler is running, no combustion products must leak from any of the seals.
• The boiler must be supplied at 230 V – 50 Hz.
• The system must be filled with water (pressure reading on water gauge 1.5 bar).
• Any stopcocks on the pipes must be open.
• The gas supplied to the boiler must be of the type for which the boiler is designed. If necessary, convert the boiler following the instructions in § 3.7. – Adapting to other gases and regulating the burner. This operation must be carried out by a qualified service engineer.
• The gas supply stopcock must be open.
• There must be no gas leaks.
• The master power switch before the boiler must be on.
• The boiler safety valve must not be blocked.
• There must be no water leaks.
• The pump must not be blocked.
• The condensate trap installed on the boiler must discharge condensate correctly and not be clogged.

The boiler is equipped with a three-speed circulation pump, corresponding to three different residual heads.
It is delivered with the circulation pump on the third speed setting.
If you wish to set a different speed, taking account of the water circulation requirements in the boiler (controlled by the water pressure switch) and the resistance properties of the system, check boiler operation under all the conditions dictated by the features of the system (e.g. closure of one or more heating zones or thermostat-controlled valves).

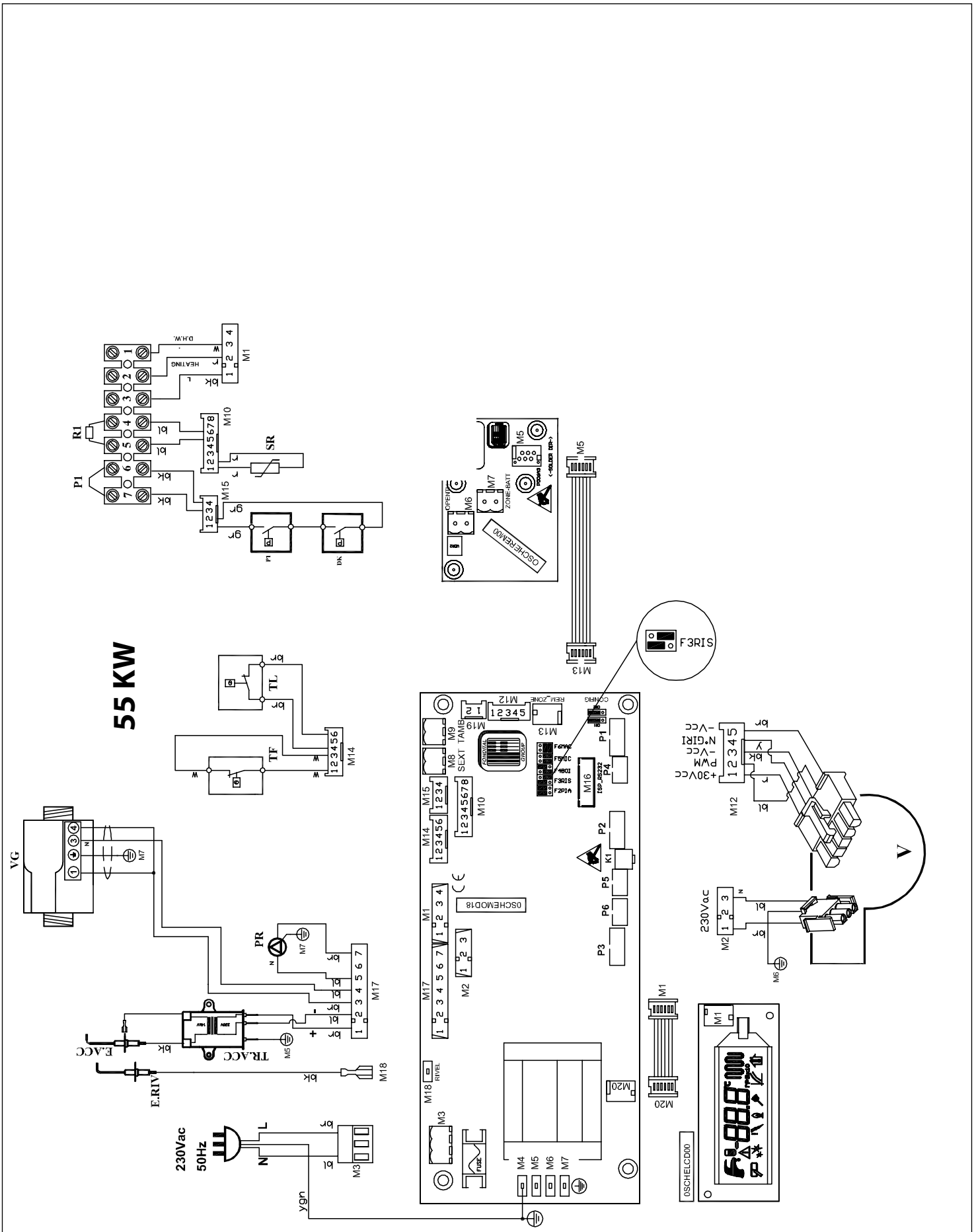
3.4.2. Switching on and off

To switch the boiler on and off, refer to the User Instructions.

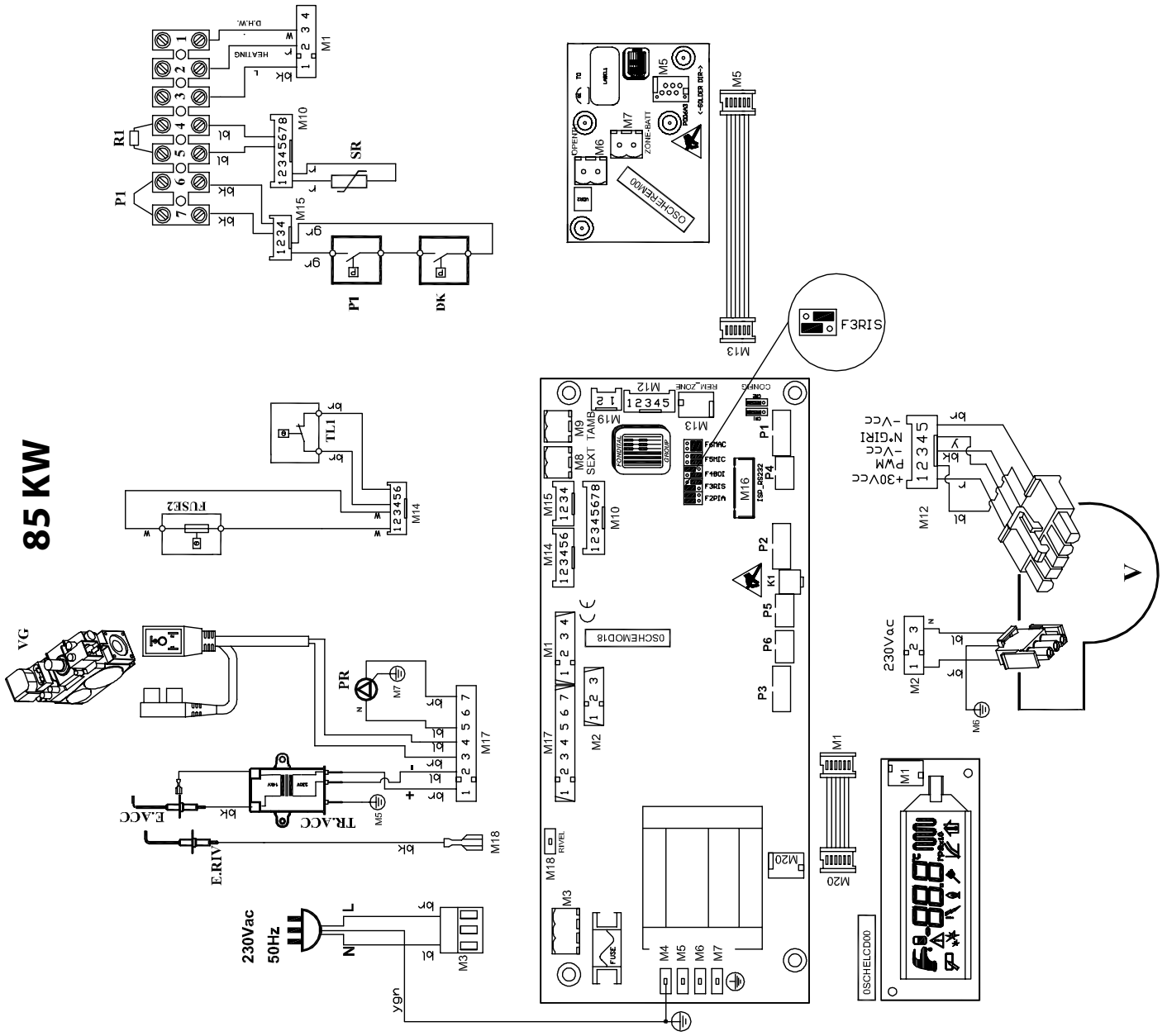
3.5. Standard control cabinet


CONTROL UNIT
MERLIN 5064
Control unit
Merlin 5064
NOTE:
Installation of the external probe and of the water heater probe is to be performed by the fitter
NOTE:
Select the jumpers for CoCo OT/CAN addressing as shown in the diagram
NOTE:
Installation of the external probe and of the water heater probe is to be performed by the fitter
NOTE:
Select the jumpers for CoCo OT/CAN addressing as shown in the diagram
SOCKET
SOCKET 1
SOCKET 2
CENTRALINA
PC
LINK TO Co/Co PC ACTIVE
module CoCo PC active
available as optional
serial cable
null-modem
Available as optional
BUS terminales
BOILER
supply OT boiler 1
supply OT boiler 2
supply OT boiler 3
supply OT boiler 4
supply OT boiler 5
supply OT boiler 6
to be carried out by the fitter
230Vac 50Hz
INTERRUT. GENERALE
0CIRCSTA18
CABLE:
JUMPER
INSULATING MATERIAL: PVC
WORKING Room temperature: 70 °C
NOMINAL TENSION FOR WIRES 1.5 sq.mm: 450/750V
NOMINAL TENSION FOR WIRES <1.5 sq.mm: 300/500V
If the individual boilers are set a distance greater than one meter from each other, and each is connected to its own safety system, each individual safety unit must be connected in series to the boiler supply.

pic. 21


55 KW
0SCHEMOD18
0SCHELCD00
F3RIS
230Vac
50Hz
TL
TF
SR
PR
TR.ACC
E.ACC
E.RIV
VG
V
P1
P2
P3
P4
P5
P6
K1
M1
M2
M3
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M15
M16
M17
M18
M20
R1
P1
ygn
gr
bk
bl
br
w
r
y

pic. 22


85 KW
D.H.W.
HEATING
M1
R1
P1
M10
SR
M15
P1
DK
M5
M7
M6
OPEN-EXT
ZONE-BATT
OSCHEREM00
M13
F3RIS
TL1
FUSE2
M14
M12
REM_ZONE
CONFIG
M9
SEXT TAMB
M8
M19
M16
P1
P4
P2
K1
P5
P6
P3
F4MAC
F5MIC
F4BOI
F3RIS
F2PIA
0SCHEMOD18
M17
M2
M1
M18
RIVEL
M3
FUSE
M4
M5
M6
M7
M20
VG
PR
TRACC
E.ACC
E.RIV
230Vac
50Hz
L
N
ygn
+30Vcc
-Vcc
PWM
N°GIRI
230Vac
V
0SCHELCD00

pic. 23

Key to symbols

F2PIA: Mono-thermal/ Aqua Premium boiler
F3RIS: CH-only boiler
F4BOI: boiler with water heater
F5MIC: micro-storage boiler
F6MAC: encased Aqua Premium boiler
M3-M8-M9: Outdoor probe power connector, TA
M16: telemetering connector
M2-M15: service connectors
E.RIV: detection electrode
E.ACC: ignition electrode
P: pump
V: brushless fan
MVD: three-way valve motor
TF1-TF2: flue gas thermostat (protecting flue gas system and heat exchanger
TR.ACC: ignition transformer
SR: 10K Ohm CH probe B=3435
SE: 0SONDAES01 external probe 10K Ohm B=3977 (optional) boiler probe to be connected to the boiler board
SS: 10K Ohm B=3435 DHW probe, max length 3 metres
TA: ambient thermostat (optional)
CM1 - CM2: jumpers for selecting the type of boiler
FL: DHW flow switch
FLP: Safety flow switch for low water in the primary circuit (CH)
VG: gas valve
TL: limit thermostat
P1: upgrading of flow temperature regulation
P2: upgrading of DHW temperature regulation
P3: boiler selector
P4: upgrading of maximum heat output
P6: thermoregulation curve regulation
K1: chimney-sweep selection button
B: external water heater with probe (remove R1)
BM120: separate water heater with bulb thermostat (remove P1)
TIMER: DHW timer (remove P1 if the TIMER is mounted)
P1: TIMER jumper – DHW priority
R1: 10KOhm resistance
REMOTE CONTROL: (optional)
CT (optional): telephone sequence switch for remote boiler activation

3.7. Adapting to other gases and regulating the burner

This boiler is built to run on the type of gas specified on the order, which is shown on the packaging and on the boiler rating plate.
If you wish to switch to another type of gas, this must be done by a qualified technician using the accessories supplied by the manufacturer. He will make the necessary modifications and adjustments to ensure efficient operation of the boiler.

KR 55

Fuel type	Diaphragm diameter (mm)
Methane gas G20	8.2
Propane gas G31	5.9

KR 85

Fuel type	Diaphragm diameter (mm)
Methane gas G20	10.3
Propane gas G31	7.9

3.7.1. Switching from METHANE to PROPANE

• Open the front panel of the boiler.
• For model KR 55, unscrew the outlet connection to the gas valve (**A** in pic. 27).
. For model KR 85, unscrew the connecting pipe between the gas valve and the fan (**D** in pic. 25).
• Replace the existing diaphragm with one for PROPANE (see table below).
• Make the reconnection (**A** in pic. 27 for KR 55 and **D** in pic. 25 for KR 85).
• Refer to § 3.7.3.

3.7.2. Switching from PROPANE to METHANE

• Open the front panel of the boiler.
• For model KR 55, unscrew the outlet connection to the gas valve (**A** in pic. 27).
. For model KR 85, unscrew the connecting pipe between the gas valve and the fan (**D** in pic. 25).
• Replace the existing diaphragm with one for METHANE (see table below).
• Make the reconnection (**A** in pic. 27 for KR 55 and **D** in pic. 25 for KR 85).
• Refer to § 3.7.3.

3.7.3. Regulating the burner

Setting maximum heat output

• Turn the maximum heat output regulator **max** (pic. 13) to MAXIMUM (fully clockwise). Maximum heat output setting is displayed on the LCD as a percentage of the boiler's maximum available value;
• position selector **2** (pic. 1) to WINTER.
• Check that the ambient thermostat (optional) is set to ON;
• Activate the chimney-sweep mode;
• Adjust CO_2 in flue gas by turning the ratio regulator **B** (pic. 26 for KR 85 and pic. 27 for KR 85) and make sure it is within the limits of Table 9;
• Operate the boiler on chimney-sweep mode and move to the following paragraph ("Minimum heat output regulation").

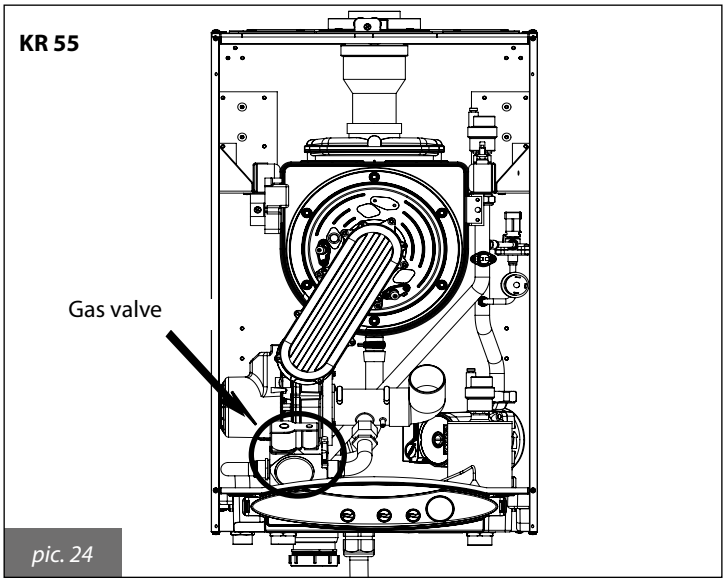
Minimum heat output regulation

• Rotate the regulator **max** (pic. 13) fully anticlockwise to set the maximum heat output to MINIMUM. The display shows the desired maximum heat output as a percentage of the boiler's maximum available heat output.
• Regulate the CO_2 in flue gas by turning the offset regulator **C** (pic. 27 for KR 55 and pic. 26 for KR 85) and make sure it is within the limits of Table 3;
• To terminate the chimney-sweep operating mode, set knob **2** (pic. 1) to any position other than WINTER and then to the desired position.

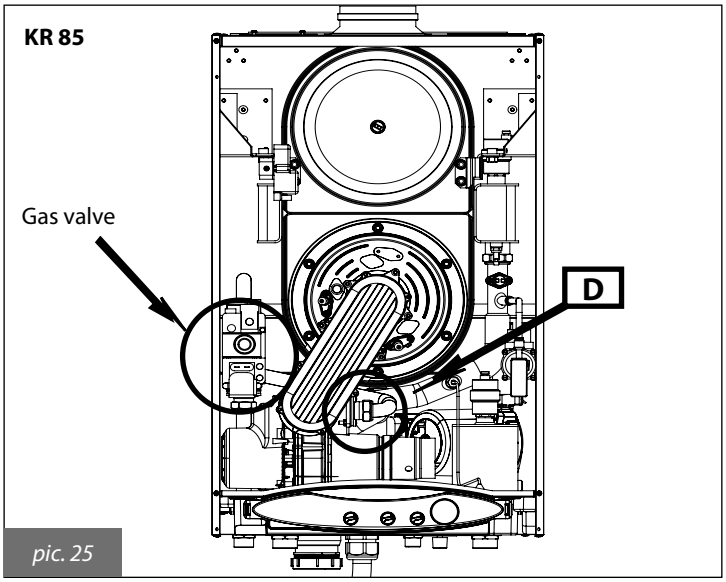
Value of carbon dioxide in the flue gas

Fuel	CO_2 rates
Methane gas	8.8 ÷ 9.2
Propane gas	9.8 ÷ 10.2

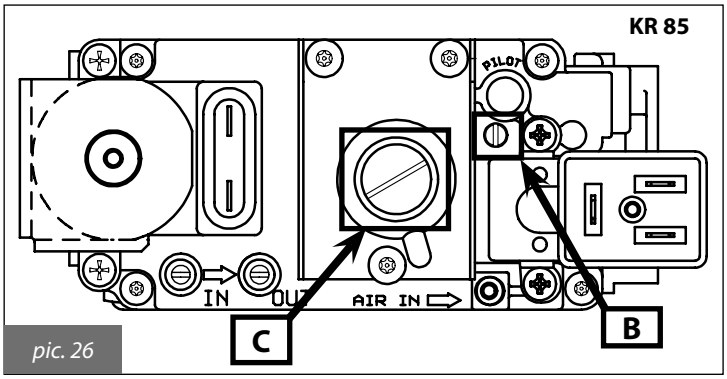
Table 9 - CO_2 rates



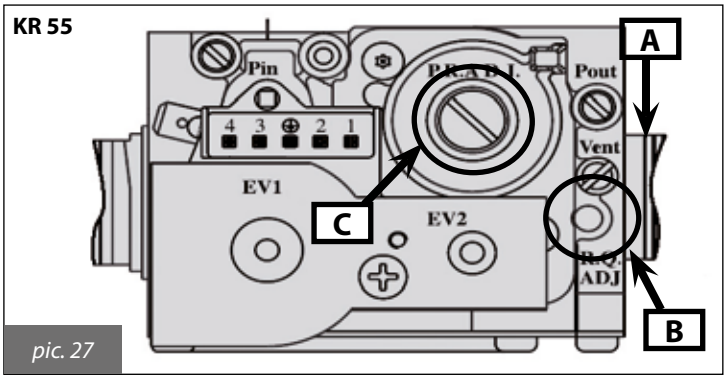
pic. 24



pic. 25



pic. 26



pic. 27

4. Commissioning the boiler

4.1. Preliminary checks

Before testing the boiler, it is advisable to check that:
• The installation complies with the current regulations.
• The flue gas exhaust pipe and terminal must be installed as instructed. **When the boiler is running, no combustion products must leak from any of the gaskets**.
• Supply power to the boiler must be 230 V – 50 Hz.
• The system must be filled with water (pressure reading on water gauge 1.5 bar).
• All the stopcocks on the pipes must be open.
• The gas supplied to the boiler must be of the type for which the boiler is designed. If necessary, convert the boiler following the instructions in subsection *3.7 - ADAPTATION TO OTHER GASES AND BURNER ADJUSTMENT*. This operation must be carried out by a qualified service engineer.
• The gas supply stopcock must be open.
• There must be no gas leaks.
• The main power switch must be on.
• The boiler safety valve must not be blocked.
• There must be no water leaks.
• The pump must not be blocked.
• The condensate trap installed on the boiler is discharging condensate correctly and is not stuck.

If the boiler is not installed in accordance with the applicable laws and regulations, inform the system supervisor and do not test the boiler.

4.2. Switching on and off

Refer to the User Instructions for details of how to switch the boiler on and off.

5. Maintenance

Maintenance and repairs must be carried out by a fully qualified technician.

The user is strongly advised to have the boiler serviced and repaired by one of the Manufacturer's fully qualified Service Centres. Correct maintenance of the boiler will allow it to work efficiently, without harming the environment, and in complete safety.

5.1. Maintenance schedule

Routine maintenance must be performed once a year.

Before carrying out any maintenance work involving the replacement of components or internal cleaning of the boiler, disconnect the boiler from the mains.

Routine maintenance must include a series of checks and cleaning operations.

Checks:
- General integrity of the boilers
- Boiler and gas supply leaks
- Boiler gas supply pressure
- Minimum and maximum gas pressures to boiler nozzles
- Boilers ignition
- Flue system integrity, good state of preservation, and leak test
- State of the thermostat on the flue gas stack
- State of combustion fans
- State of the Hall sensors
- General integrity of the boilers safety devices
- Integrity, state of preservation and seal of the flue gas discharge pipes
- Boiler safety valve efficiency
- Expansion vessels pressure
- Efficiency of water minimum/differential switches
- Correct discharge of condensates through the condensate drains installed on each separate boiler

Cleaning operations:
- Inside of the boiler
- Burner
- Gas nozzles
- Air intake and flue gas discharge circuit
- Heat exchanger
- Condensate discharge ducts
- Drain siphons for discharge of condensate

Checks to perform when using the boiler for the first time.
- User manual
- Suitability of the boiler room
- Flue gas discharge pipes – diameters and lengths
- Boiler installation in accordance with the instructions in this manual

If the boiler does not work properly or if it poses a danger to people, animals or property, inform the system supervisor and compile a report.

In case of electronic board failure, any attempt to repair is forbidden. It is advisable to carefully protect the electronic board from any dripping water that could damage the internal circuits.

5.2. Combustion analysis

The boiler combustion parameter check to assess efficiency and polluting emissions must be performed in accordance with the applicable laws and regulations.

6. Troubleshooting

The following problems apply to all the individual boilers included in the cascade. In addition to being shown on the LCD display of the boilers, they are also displayed by the control unit.

BOILER STATUS	PROBLEM	POSSIBLE CAUSE	SOLUTION
The boiler has locked out. The symbol is displayed and code E01 flashes. Turn selector 2 to RESET to resume boiler operation.	**Burner does not ignite**	Gas supply failure	Check gas pressure. Check that the gas valve opens or whether any system safety valves have cut in.
		Gas valve disconnected	Reconnect it
		Gas valve faulty	Replace it
		PCB faulty	Replace it
	Burner does not ignite: spark not generated	Ignition electrode faulty	Replace the ignition electrode
		Ignition transformer faulty	Replace the ignition transformer
		PCB faulty	Replace the PCB
	Burner ignites for a few seconds and then goes off	PCB does not detect the flame: phase and neutral connections are inverted	Verify correct neutral and phase connections to the power mains
		Flame detection electrode wire faulty	Reconnect or replace the wire
		Flame detection electrode faulty	Replace the electrode
		PCB does not detect flame	Replace the PCB
		Ignition value setpoint too low	Increase value setpoint
		Min. heat input not set correctly	Check burner setting
The boiler has locked out. The symbol is displayed and code E03 flashes. Turn selector 2 to RESET to resume boiler operation.	**One of the boiler safety thermostats has cut in**	Difficult draught at chimney	Check the chimney and ambient air suction grids
		Flue gas thermostat faulty	Replace it
The boiler has locked out. The symbol is displayed and code E02 flashes. Turn selector 2 to RESET to resume boiler operation.	**Boiler safety thermostat has cut in**	CH water does not flow: pipes might be clogged, thermostatic valves might be shut, system stopcocks might be closed	Check the CH system
		Pump blocked or faulty	Check the pump
The boiler has locked out. The symbol ⚠ is displayed and code E10 flashes. Operation is resumed as soon as the CH plant pressure is restored.	**Insufficient water in the system**	Possible water leaks	Check the system for leaks
		Main flow switch disconnected	Reconnect it
		Main flow switch faulty	Replace it
The boiler has locked out. The symbol ⚠ is displayed and code E05 flashes. Operation is resumed automatically when the cause of shutdown has been removed.	**CH probe not working**	CH probe disconnected	Reconnect it
		CH probe faulty	Replace it

BOILER STATUS	PROBLEM	POSSIBLE CAUSE	SOLUTION
The boiler does not work properly. The symbol ⚠ is displayed and code E17 flashes. Operation is resumed automatically when the cause of shutdown has been removed.	**Combustion fan not working**	Fan disconnected	Reconnect it
		Fan faulty	Replace it
The control unit is off, on the boiler LCD the symbol ⚠ is displayed and code E22 flashes. Operation is resumed automatically when the cause of shutdown has been removed.	**Communication with the external control unit impossible**	The wire connecting the boiler to the control unit is disconnected.	Reconnect it
		Control unit faulty.	Replace it

The following problems relate to the system's control unit.

COMMUNICATION ERRORS

ERROR	DESCRIPTION
E 90	Address 0 and 1 in BUS. BUS 0 and 1 codes cannot be used simultaneously.
E 91	BUS address occupied. The set BUS code is already used by another appliance.
E 200	Boiler 1 communication error.
E 201	Boiler 2 communication error.
E 202	Boiler 3 communication error.
E 203	Boiler 4 communication error.
E 204	Boiler 5 communication error.
E 205	Boiler 6 communication error.
E 206	Boiler 7 communication error.
E 207	Boiler 8 communication error.

INTERNAL ERRORS

ERROR	DESCRIPTION
E 81	EEPROM error. The non-valid value has been replaced by the standard value. ⚠ Check the parameter values.

PROBE ERRORS

ERROR	DESCRIPTION
E 69	F5: boiler 2 flow probe.
E 70	F11: boiler 1 flow probe, multi-purpose probe 1
E 71	F1: buffer below probe
E 72	F3: buffer above probe
E 75	F9: external probe
E 76	F6: tank probe
E 78	F8: boiler probe / manifold probe (cascade)
E 80	boiler 1 ambient probe, F2: buffer at the centre of the probe
E 83	boiler 2 ambient probe, F15: swimming-pool probe (water heater 3)
E 135	F12: water heater probe, multi-purpose probe 2
E 136	F13 (PT1000): boiler 2, manifold 2, multi-purpose probe 3
E 137	F14 (PT1000): manifold 1, multi-purpose probe 4

0LIBMUEN30

Fondital S.p.A.
25079 VOBARNO (Brescia) Italy - Via Cerreto, 40
Tel. +39 0365 878.31 - Fax +39 0365 878.304
e mail: info@fondital.it - www.fondital.com

The manufacturer reserves the right to modify the products
as it deems necessary and useful, without affecting their basic features.

Uff. Pubblicità Fondital IST 03 C 438 - 02 Luglio 2014 (07/2014)